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Australasian Plant Conservation

BULLETIN OF THE AUSTRALIAN NETWORK FOR PLANT CONSERVATION

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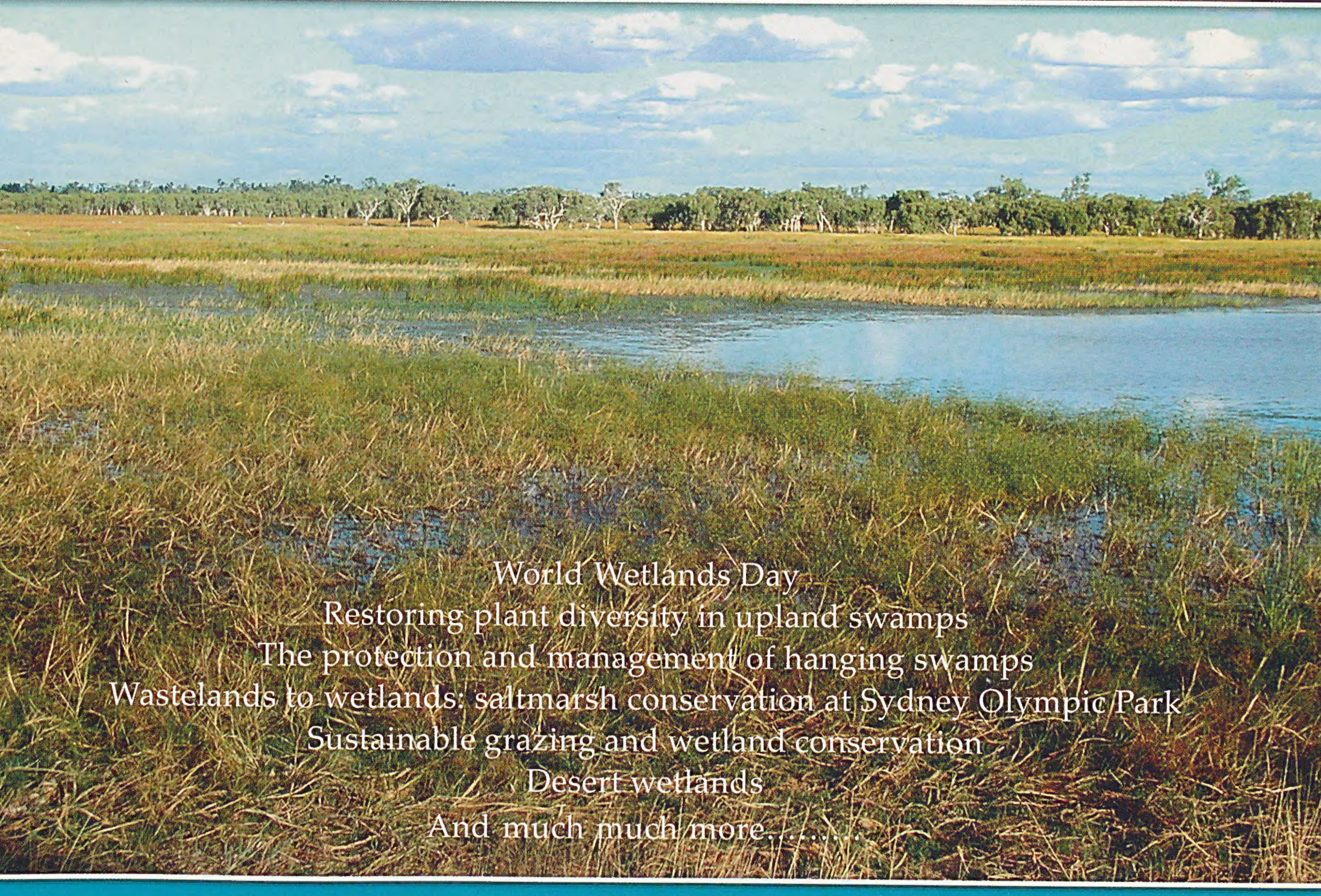

World Wetlands Day
Restoring plant diversity in upland swamps
The protection and management of hanging swamps
Wastelands to wetlands: saltmarsh conservation at Sydney Olympic Park
Sustainable grazing and wetland conservation
Desert wetlands
And much much more.........

Special Edition: CONSERVING WETLAND PLANT DIVERSITY

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Fiona Hall, Tricia Hogbin. Thanks also to Kirsten Cowley and Sally Stephens.

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"To promote and develop plant conservation in Australia"

Contributing to *Australasian Plant Conservation*

Australasian Plant Conservation is a forum for information exchange for all those involved in plant conservation: please use it to share your work with others. Articles, information snippets, details of new publications or research, and diary dates are welcome. The deadline for the March-May 2005 issue is Friday 4th March. The March-May issue will be a special edition on 'Pathogens and Plant Conservation (see note on page 1)'. Articles not on this theme are still welcome.

Authors are encouraged to submit images with articles or information. Please submit images as clear prints, slides, drawings, or in electronic format. Electronic images need to be at least 300 dpi resolution, submitted in at least the size that they are to be published, in tif, jpg or gif format.

Please send typed or handwritten articles, no more that 2 A4 pages (or 1100 words), by fax, mail, email, or on diskette. If sending by email, please send as a MS Word (2000 compatible) or rich text format attachment to: anpc@deh.gov.au.

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Front cover: (l-r) *Banksia robur, B. oblongifolia*, and *Hakea teretifolia* over a sedge understorey at Strickland State Forest. Photo: Stephen Bell; The threatened saltmarsh plant *Wilsonia backhousei*. Photo: Sydney Olympic Parks Authority; Constructed wetland series at Riverina Institute of TAFE National Environment Centre. Photo: Gerard Lawry; (main) Lacustrine wetland in the Gulf Plains bioregion. Photo: Gary Wilson **Cover design:** Siobhan Duffy. **Printed by:** Pirion, Canberra.

President's report

Judy West
Centre for Plant Biodiversity Research
CSIRO Plant Industry

Royal Botanic Gardens
Melbourne
14 FEB 2005
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This report for APC incorporates the essence of my President's Report presented at the ANPC Annual General Meeting in November 2004, and as such will recap on some of the activities of the organisation during the past year.

The ANPC has faced some challenging moments during this past year complemented by many exciting times and events taking us in new directions.

The largely new committee has worked well together and individual contributions have been outstanding. The ANPC should be proud of the dedication of its elected office bearers. I would like to take this opportunity to sincerely thank the retiring members of the National Committee, Stephen Harris, Kingsley Dixon, David Given and Tracey Armstrong, for their long term commitment to the organization, which I am sure will continue under different guises. In addition, our Treasurer Gerald Mueller must retire at this time - Ged has grappled with some difficult situations and funding uncertainties during his term and we are extremely grateful for his efforts and major contribution.

It is also a great pleasure to welcome some new members to the National Committee. Helena Mills, Trevor Christensen and Paul Janssens were all elected at the recent Annual General Meeting and we anticipate great enthusiasm and an influx of fresh ideas! We will include some short biographies in upcoming APCs for you to get to know your committee members.

The two new staff members, Pam Strickland (holding the office together) and Sally Stephens (Project Officer for the environmental grants and workshop organiser), have become ANPC enthusiasts and are working very hard to keep the organisation buzzing.

In June we launched the second edition of the *Guidelines for the Translocation of Threatened Plants in Australia* at the Royal Botanic Gardens in Sydney. The production and publication was supported by the NSW Environmental Trust, which also assisted with distribution. This new edition, supported by the NRM Ministerial Council, reflects advances in scientific practice and the greatly increased practical experience in translocation. With more than 500 copies having been distributed, the Guidelines appear to have been well received with considerable positive feedback.

The **high quality training workshops** organised and hosted by the ANPC during this past year have contributed significantly to the scientific level of information provided to practitioners. The feedback from each of the

The next issue of APC will be a SPECIAL EDITION on:

PATHOGENS AND PLANT CONSERVATION

Articles and short notes on projects or research relevant to pathogens and plant conservation are invited.

This issue will examine the emerging problem of *Phytophthora* in eastern Australia, and will include papers from a *Phytophthora* forum held in Sydney last year. It will also cover other pathogens (and pathogenic syndromes like Mundulla Yellows) of conservation significance, such as *Armillaria*, Guava Rust and Bell Miner Dieback. We are also interested in articles related to pathogen threat assessment (both importation risks and difficulties in early assessment of threat processes).

See title page section on 'Contributing to *Australasian Plant Conservation*' for additional information.

Have you renewed your membership for 2005?

The year you have paid up to appears on the flysheet above your address. If you need to renew, please complete a membership renewal form (was provided in the last issue of APC or download from www.anbg.gov.au/anpc) and return to the ANPC National Office.

workshops has been extremely complimentary on the quality of presentations, as well as the relevance of the content.

A series of "**Translocation of Threatened Plants" workshops** have been held responding to user demand. The first of these, in February at Mt Annan Botanic Gardens, was followed by another in June at the RBG Sydney. Extending beyond NSW, the Victorian Department of Sustainability and Environment and North Central CMA partly sponsored a third translocation workshop in Bendigo in September, as did Kings Park & Botanic Garden and the WA Department of Conservation and Land Management (CALM) in November. In addition, another translocation workshop took place in south-east Queensland as part of the Envirofund grant jointly supported by the Queensland Government Environment Protection Agency.

Three or four ANPC committee members have provided the core of presentations for each of these workshops and their formula, incorporating real case scenarios into the program, seems to have hit on a winning combination. I would like to express gratitude on behalf of all of us in the ANPC to those members who have contributed so much of their time and energy to the success of these workshops.

With Roger Good's major assistance and support from TransGrid we also held an **alpine workshop:** *Ecological Restoration for Mountain Environments - approaches and techniques* in April, with 92 participants. There appears to be some interest in ANPC being involved in more of this type of biome oriented training for restoration techniques and experiences.

In late November/early December as part of the **Envirofund** Grant, our project officer Sally Stephens organised an extravaganza of three workshops and two one-day field trips in south-east **Queensland**. One of these sessions was the translocation workshop, as well as two (repeat) workshops on *Approaches and Techniques for the Rehabilitation of Native Vegetation in South-east Queensland* - one held in Brisbane at the Mt Coot-tha Botanic Gardens and the other at University of Queensland Gatton campus. Sally committed enormous energy to bring these events together and participant responses the effort has been well worthwhile. See separate report on page 4.

Following the very successful alpine restoration workshop in April, the ANPC will be running three more workshops on post-disturbance rehabilitation of plant biodiversity in NSW during 2005. Details of these will be provided as they are developed - keep an eye on the ANPC website. These workshops are supported by the NSW Environmental Trust.

It is extremely encouraging to review the collaborative partnerships that ANPC has developed with a wide range of organizations, all of whom have generously assisted with running these training sessions. It is clear there is a demand to increase the scientific level of information being provided to those of our community responsible for on-ground management and conservation. I wish to acknowledge the generous backing and cooperation of the various organizations and agencies as mentioned above.

Australasian Plant Conservation (APC): it is exciting to see the content of the Bulletin expanding to incorporate more substantial articles, for which we have received positive feedback. In addition, the concept of publishing issues of APC dedicated to a particular theme, such as this one on wetlands, seems to have met with approval. We are planning for the next issue of APC to be centred around pathogens and plant conservation. Feedback from members on these issues and other suggestions would be very helpful.

The next **ANPC National Conference** - will be held in Adelaide from 26 September to 1 October, 2005. The general theme of the conference will be: *Plant Conservation - the challenges of change* - with the intention of dealing with various types of change, such as climate, threats and policy. This conference will be hosted jointly with the South Australian Department of Environment and Heritage (DEH) and the Botanic Gardens of Adelaide. Notifications will be distributed soon and further information will be incorporated into the next issue of APC.

As a leadup to the national conference and to bring attention to our activities in South Australia and beyond, the ANPC and the SA DEH jointly sponsored a symposium within the Ecological Society of Australia (ESA) conference in Adelaide in December. The symposium, entitled *Revegetation and Ecological Functionality,* attracted 13 papers and a very good attendance, and stimulated much discussion. I would like to thank the ESA for incorporating our symposium suggestion into the conference, and look forward to further interaction with the society in the future.

In approaching the new year I am sure the ANPC is going to be faced with many more challenges and opportunities. The important point, as an organization and an active conservation network, is that we can look back on the year and see that we have made a difference. I feel the ANPC has definitely achieved that goal in 2004.

What's on for wetlands in 2005?

Alison Beard
Inland Waters Section, Department of the Environment and Heritage

World Wetlands Day, 2nd February 2005

World Wetlands Day (WWD) is celebrated each year on the 2nd of February. It marks the anniversary of the signing of the Convention on Wetlands (Ramsar Convention) in Ramsar, Iran, on 2nd February 1971 (for more, see below).

WWD was first celebrated in 1997. Since this time government agencies, non-government organisations and community groups have celebrated WWD through actions to raise public awareness of wetland values and benefits and promote the conservation and wise use of wetlands. These activities include seminars, nature walks, festivals, launches of new policies, announcements of new Ramsar sites, newspaper articles, radio interviews and wetland rehabilitation activities.

The theme for World Wetlands Day 2005 is "Cultural and Biological Diversity of Wetlands".

World Wetlands Day provides a great opportunity for community groups and individuals to celebrate the valuable work they do to protect and enhance our unique wetlands and the plants and animals they support. It also provides the perfect opportunity for us all to take time out of our busy lives to enjoy the natural and cultural aspects of wetlands that make them so special.

Last year's WWD

The theme for WWD 2004 in Australia was "Water for Wetlands – Water for Life". Twenty-six WWD events were undertaken across all states and territories and were promoted in a national WWD events calendar.

These and other activities received much media attention in the weeks before and during World Wetlands Day/Week 2004, promoting WWD and associated activities and providing information on specific wetlands issues. Local media promotion of individual events was particularly successful with hundreds of people, in some cases, taking the opportunity to visit their local wetland.

Boardwalks, such as this one at Lake Clifton, provide access to wetlands. Photographer: Mark Butz

If you would like to see what has been happeneing to celebrate World Wetlands Day 2005, check out our website (www.deh.gov.au/water/wetlands/day/index.html). The reports and evaluations for WWD 2003 and 2004 are also available (www.deh.gov.au/water/wetlands/day/report/index.html and www.deh.gov.au/water/wetlands/day/report-04.html respectively).

Ninth Ramsar Conference, Uganda, November 2005

Some of our most important wetlands have received recognition and protection under the Convention on Wetlands (Ramsar, Iran, 1971), commonly known as the Ramsar Convention. The broad aim of the Convention is to halt the world-wide loss of wetlands and to conserve those that remain through wise use and management. This requires international cooperation, policy-making, capacity building and technology transfer.

The Convention was signed by representatives of 18 nations (including Australia) at the small Iranian town of Ramsar in 1971. The Ramsar Convention was the first inter-governmental treaty between nations for the conservation of natural resources. There are over 140 Contracting Parties to the Convention who have designated more than 1300 wetland sites throughout the world to the Ramsar List of Wetlands of International Importance.

The Ninth Conference of the Contracting Parties to the Convention on Wetlands (COP9) will be held in Kampala, Uganda 7-15 November 2005. The Contracting Parties meet every three years to discuss policy issues and to report on the activities of the previous triennium through national reports.

Australia will report on relevant legislation, institutions and practices drawing on examples from all over the country. Case studies will also be presented at COP9, highlighting the initiatives being undertaken by government and community members to assist with the conservation and management of our important wetlands.

The National Report for COP9 will be available on the Australian Government's Wetlands website in "What's New?", so watch that space (www.deh.gov.au/water/wetlands/bulletin/index.html).

For further information on the Convention on Wetlands and/or COP9 visit the Ramsar Convention Secretariat's website www.ramsar.org. For further information on the implementation of the Ramsar Convention in Australia, please contact Sarah Young, Inland Waters Section of the Australian Government Department of the Environment and Heritage (sarah.young@deh.gov.au or on 02 6274 2791).

Workshop marathon in south east Queensland

Sally Stephens, ANPC Project Manager

'*Great diversity of topics, issues and presenters*', '*good coverage of the breadth of aspects involved in rehabilitation, including where to source information*', '*amazing*' – these were some of the evaluation responses provided by the participants in three recent ANPC workshops.

Designed for SEQ

Between 28 November and 4 December 2004, the ANPC, in association with the Queensland Herbarium, ran three workshops designed specifically for south east Queensland. A three-day workshop on *Approaches and Techniques for the Rehabilitation of Native Vegetation* was held at the University of Queensland's Gatton campus and repeated at the Brisbane Botanic Gardens at Mt Coot-tha. Each of these workshops included a one-day field trip to local rehabilitation sites.

The companion workshop on the *Translocation of Threatened Plants in Australia* was also held at the Botanic Gardens, and included some participants from the rehabilitation workshop. This was the fifth translocation workshop ANPC has run, with the core group of presenters being the authors of the revised *Guidelines for the Translocation of Threatened Plants in Australia.* Four local presenters detailed case studies from south east Queensland.

Structure and content

Numerous practitioners and researchers from south east Queensland helped design the rehabilitation workshops, which revolved around planning a rehabilitation project. With a well-considered plan as a core focus, the sessions were grouped into four main stages:

Stage 1: Knowing your vegetation remnant: This stage included 'sources and resources' of existing information, and demonstrations of techniques to reveal more about the site (mapping, plant identification software, monitoring and soils) and techniques to assess the quality, condition and recovery capacity of the remnant.

Stage 2: Assessing and determining the rehabilitation task: The key message in this session was defining the project goal in the context of the site and its potential, as well as the desires and needs of the community involved.

Stage 3: Developing the rehabilitation plan: This stage discussed the many issues to be considered and the details to be included in the plan, such as identifying impacts, risks, implications of actions, resources, monitoring and evaluating, flexible planning, consultation and communication.

Some of the science critical to the planning process was also discussed, including the ecology of remnants, conservation genetics, provenance, fire management and experimental techniques.

Stage 4: Monitoring, monitoring and more monitoring: This session argued that monitoring should be an integral part of a rehabilitation project. A case study demonstrated some of the difficulties encountered in designing useful monitoring that could be repeated by people not involved in the original project.

Workshop participants enjoying the shade while inspecting vegetation linkages on farmland in the Minden Hills. Photo: Grant Wardell-Johnson.

Following the above rehabilitation planning stages, a session on funding and forming partnerships included the uplifting claim that there is more money available for community projects 'than there has ever been'.

'Reality checks'

Case studies gave life to many of the topics being discussed, and provided useful insights. Several panel discussions enabled participants to delve deeper into some topics or to raise specific issues and queries.

Evaluation scores after the workshops averaged 8 or 9 out of 10 for all questions on the evaluation form across all three workshops. For 'value for money', one participant gave a score of 11½ while another gave 12! The 'preferred topics' reads like a list of the workshop topics with no clear winners or losers. Some useful suggestions for other topics, issues and approaches will be considered in future workshop development.

Accreditation for workshop participation

For the first time, accreditation was offered to ANPC workshop participants, in association with the Registered Training Organisation *Hortus Australia*. Participation can contribute to nationally recognised qualifications under the Conservation and Land Management Training Package. Twenty-three people took up this offer.

Marine couch reclaimed from a toxic dump at the Bulimba Creek Oxbow rehabilitation site by a coalition of government, industry and community. Photo: Ralph Dowling.

Thanks and more thanks

Heartfelt thanks to the 35 very generous presenters who made these three workshops possible! These included practitioners and researchers from environmental consultancies, industry, Landcare, Greening Australia, state and local government, regional bodies, universities and CRCs. Most presenters gave sessions at both rehabilitation workshops and two presented at all three workshops. Many also participated fully in other workshop sessions.

The 138 participants came from a similar range of organisations, and also included private practitioners and enthusiasts. Many of the participants could have run sessions themselves, as their skills and experience were rich and diverse. A bonus for all involved was the exchange of ideas and networking.

Support for these workshops was provided by a Natural Heritage Trust Envirofund grant, with substantial in-kind support from our project partner, the Queensland Herbarium (Environment Protection Agency) under the leadership of Gordon Guymer. Ralph Dowling, a principal botanist with the Herbarium, took on much of the organisation with gusto, and his professionalism contributed enormously to the success of the workshops. Ross McKinnon, Director of the Brisbane Botanic Gardens, generously provided the auditorium free of charge.

Grant Wardell-Johnson, of the University of Queensland, also arranged free use of teaching rooms at the Gatton campus, as well as presenting and driving a field trip bus. Too many to name here, field site hosts guided us through their rehabilitation projects, contributing time, energy and enthusiasm (as well as iced water!). Powerlink allowed us to visit their major rehabilitation site at the Bulimba Creek Oxbow. Greening Australia also provided presenters and participants through their 'Exchange' Program. Student volunteers Heather Brownlie, Rhonda Martin and Brent Tangey valiantly assisted with an array of jobs, including registrations and washing up!

To all those who made the workshops so successful – MANY THANKS!

Visit the ANPC website to see the workshop programs and presenters, and to keep an eye on future workshops. A full report on these workshops will be posted on the website when finalised.

These workshops were a joint project of the ANPC and the Queensland Herbarium (EPA) and supported by a Natural Heritage Trust Envirofund Grant, the Brisbane Botanic Gardens (Brisbane City Council) and the University of Queensland.

Natural Heritage Trust
Helping Communities Helping Australia
An Australian Government Initiative

AUSTRALIAN Government envirofund

Queensland Government
Environmental Protection Agency

THE UNIVERSITY OF QUEENSLAND

BRISBANE CITY

Restoring plant diversity in upland swamps of the Mount Lofty Ranges

Tim Jury[1] *and Tom Hands*[2]
[1]*Threatened Plant Action Group, c/- Nature Conservation Society of South Australia, email: tpag@ncssa.asn.au*
[2]*Friends of Scott Creek Conservation Park*

Upland swamps in the south Mount Lofty Ranges of South Australia are unique ecosystems. Small and typically hidden away, these wetlands occur along steep mountain gullies in the highest rainfall region of the state. They contain restricted, naturally rare biota including high concentrations of threatened plant species. Much of the upland swamp habitat in the ranges has been destroyed or modified with remaining examples under significant threat from weed invasion, grazing and inadequate conservation management.

A restoration project was initiated in the ranges at Scott Creek during 1996 by the Friends of Scott Creek Conservation Park (FOSCCP). Objectives were to reduce the impact of threats on these wetlands and to return them to their pre-European floristic composition and structure. This article outlines the threats to remaining swamps and summarises the conservation gains that have been made through this wetland restoration project.

Upland swamps in the southern Mount Lofty Ranges

Colloquially known as swamps, these ecosystems can be subdivided into wetland categories based on their biophysical attributes such as geomorphology, hydroperiod and structural floristics. Upland swamp is a general term for wetlands that include more specific communities such as perched bogs, hillside soaks, and valley mires.

Typically they occupy small areas along narrow spring-fed gullies or are occasionally perched on hillsides, and tend to form a patchy network of wetlands linked by upland watercourses. Typical vegetation communities tend to be a mosaic of plant associations which include tea-tree and wattle shrublands, as well as areas of fern and sedgeland that intergrade with eucalypt forests and woodlands, particularly Messmate stringybark (*Eucalyptus obliqua*).

Conservation significance

These upland swamps support plant community and ecosystem types that are threatened in the region (Turner, 2001), in South Australia (DEH, 2001) and at a national level (Duffield *et al.*, 2001). Plant guilds that are dependent on permanently running water or damp conditions, such as hydrophytes and rheophytes, are closely associated with these habitats. Upland swamps support a disproportionately high percentage of the region's rare or threatened plant taxa. Around 42% of the plant species of conservation significance in the region are confined to these ecosystems (Lang & Kraehenbuehl, 1997). Many swamps contain rare angiosperm, pteridophyte and orchid species, including the threatened Derwent speedwell (*Derwentia derwentiana* ssp. *anisodonta*) and swamp raspwort (*Haloragis brownii*). Protection of these wetland ecosystems at a landscape level is required to conserve almost half of the region's threatened flora.

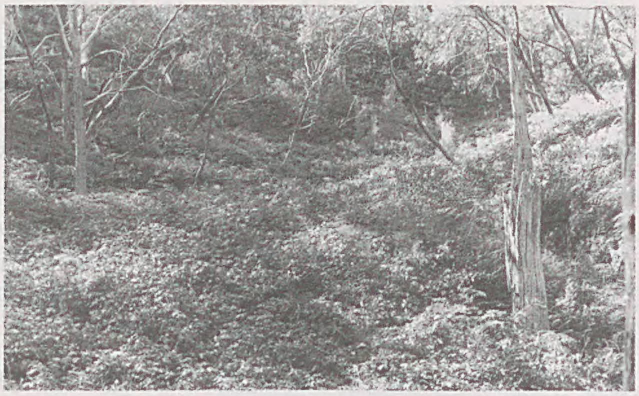
These communities also provide critical habitat for threatened fauna such as the southern brown bandicoot (*Isoodon obesulus*) and Bassian thrush (*Zoothera lunulata*).

Threats to plant diversity

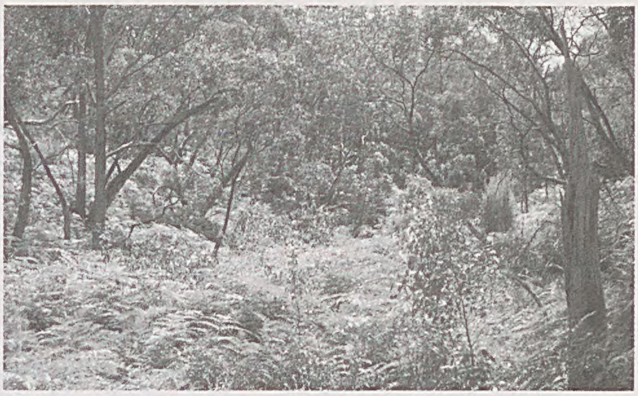
Upland swamps are under immense threat in the region from a wide range of degrading processes. Since European settlement many swamps have been cleared, drained, filled or developed for intensive horticulture. Impacts of vegetation clearance are often exacerbated by stock grazing and the intentional introduction of plant species. Most remaining swamps have been profoundly changed or modified.

These changes have resulted in widespread habitat degradation and invasion by environmental weeds like

The threatened Derwent speedwell: Derwentia derwentiana ssp. Anisodonta. *Photo: John Butler*



Blackberry invaded site prior to implementing restoration measures. Photo: John Butler



Regeneration of the same site following weed management. Photo: John Butler

blackberry (*Rubus fruticosus* aggregate) and willow (*Salix* sp.), as well as broom and tree heath (*Erica arborea*) in some areas. These weeds displace indigenous flora by transforming plant community structure and local soil properties. In particular, extensive blackberry thickets throughout upland watercourses and wetlands in the ranges are the main threat to floristic diversity. These dense thickets eliminate most indigenous plant species and prevent their regeneration. This simplification of habitat structure dramatically reduces niche variability, floristic composition and plant species diversity. Weed invasion severely compromises the capacity of these wetlands to support the restricted plant species that are confined to them, incrementally resulting in biodiversity loss through a cascade of local extinctions.

Repairing degradation and assisting regeneration

Work by FOSCCP has focused on several wet gullies in the reserve, where the group has concentrated on selectively managing weeds through slashing and spot-spraying of blackberry during active growth periods; cut-and-swab treatments for established woody weeds (broom, tree lucerne and erica); and stem injections for larger exotic trees such as willows. Over the last eight years management targets have shifted from the initial objectives of reduction (removing dense blackberry thickets) to subsequent containment and follow-up of weed regrowth through careful spot spraying and cut-and-swab methods. Restoration is being implemented through a staged strategy, targeting more intact sections around gully headwaters before moving further down into more densely infested areas.

The impacts on plant community structure, biomass composition, and species diversity have been spectacular. Reducing weed abundance has stimulated vigorous regeneration of dominant structural species such as silky tea-tree (*Leptospermum lanigerum*), red-fruit cutting-sedge (*Gahnia sieberiana*), and soft water-fern (*Blechnum minus*). Many threatened plants have also been uncovered, including two small herbaceous species not previously recorded for the region, swamp mazus (*Mazus pumilo*) and *Pratia puberula*.

A central aim has been to recreate a habitat structure that promotes recruitment of indigenous plants by facilitating growth and expansion of remnant clumps of shrubs, sedges and ferns through the control of competing weed growth. In some instances prolific regeneration of bracken (*Pteridium esculentum*) following weed removal has provided useful cover to compete with blackberry regrowth. Selective slashing has then been used to create germination and establishment space for other indigenous plant species.

The approach of this project has been to work with or assist natural regeneration in order for wetland areas to recover indigenous plant biomass and species diversity. Success can be attributed to the persistence of the group in undertaking the routine follow-up work needed to guide successional recovery.

The future

A substantial increase in management resources needs to be directed to these ecosystems for threat abatement in the future. Opportunities to enhance project continuity and integration through regional biodiversity partnerships are currently being explored by the Friends group, who recently gained some recognition for their work by winning two Civic Trust awards for this project.

The degradation of upland watercourses and associated ecosystems is one of the most serious and neglected environmental problems facing this generation (Closs, 1998). In the South Lofty Ranges alone just 1% of riparian vegetation remains in good health (SA Water, 2000). Reservation in itself will not ensure long-term protection for upland swamp ecosystems, particularly in more fragmented landscapes.

If we are serious about the in situ conservation of plant diversity in these important wetlands we need to dramatically upscale the current restoration and management effort. Unless this occurs conservation programs in the region will continue to fall short of preventing further species loss.

Acknowledgements

The authors acknowledge those who have contributed toward this project including: John Butler, Robert Bates, Don Reid, Yvonne Steed and members of the FOSCCP. Three small grants obtained from DEH, Urban Forests and Biodiversity Program and Envirofund for project support are acknowledged. The Department for Environment and Heritage is recognised for their cooperation with this project.

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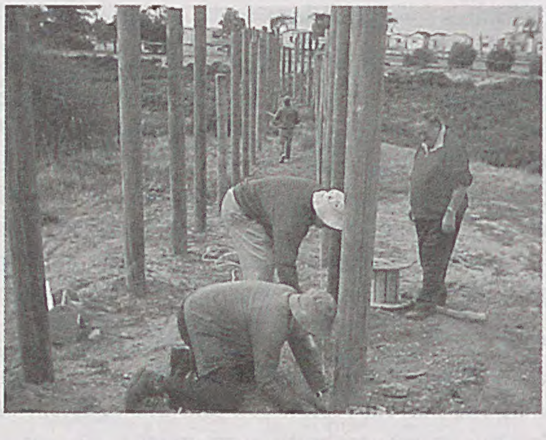
Note: An unabridged version of this article is available from the authors.

Revive our Wetlands: a national practical wetland conservation program

Libby McIntyre
Conservation Volunteers Australia. Email lmcintyre@cva.org.au

Wetlands are ecologically, socially and economically very important and provide a number of ecosystem functions, services and other benefits. Swamps, lagoons, and saltmarshes are fascinating places, made up of a mosaic of plant species and wildlife. Their values and importance are often represented in subtle ways, such as the delicate saltmarsh plant communities and the rich mudflats. This article describes a collaborative project between two enterprises that are normally not seen in the same locale: a conservation organisation (Conservation Volunteers Australia, CVA) and a multinational resource manager (BHP Billiton). The very successful partnership is called Revive our Wetlands, in which we engage, train and manage volunteers from around Australia and overseas to get involved in practical wetland restoration work.



Men at work - building the boardwalk at Milang. Photo: Karyn Bradford

Revive our Wetlands

Between 2000-2003, more than $2.5 million worth of assistance and over 17,000 volunteer days were contributed to the revitalisation of 100 of some of Australia's most significant wetlands. Between 2004 and 2006 Revive will invest an additional $1.5 million and 15,000 volunteer days at 10 priority locations and other sites across remote, regional and urban Australia. These projects cover a diverse range of wetland types, from a chain of wetlands along the Swan Coastal Plain in WA, to old heavily grazed farming land now owned by Trust for Nature along the Murray River, to a Ramsar listed wetland 30 minutes from the centre of Melbourne (see case study below).

Up to November 2004, Revive, with the assistance of thousands of committed volunteers, had controlled 2241 hectares of weeds, removed 2273 kilos of rubbish, erected 65 kilometres of fencing and constructed and maintained over 100 kilometres of track/boardwalk. The program has planted over 291,000 stems while propagating 47,000 more plants and collecting 210 kg of seed. More than 100 flora and fauna surveys have also been undertaken.

The program has also been raising the profile of wetlands around the country through over 400 press articles and radio interviews. A newsletter is regularly distributed to over 1000 people and organisations. More than 500 staff from BHP Billiton have enthusiastically contributed their time and energy to receive a practical wetland education. The program's success became a benchmark for Business-Community Partnerships in Australia. In December 2002 Revive won the National Large Business category of the Prime Minister's Award for excellence in Community Business Partnerships. In July 2003 it was also awarded the National Partnership of the Year in the Financial Review Magazine 2003 Corporate Partnership Awards.

Cheetham Wetlands: restoring saltmarsh

Cheetham Wetlands are on the western shores of Port Phillip Bay, 20kms south west of Melbourne. They comprise approximately 420 ha of both artificial and natural lagoons created from an old saltworks. The saltmarsh, combined with the natural lagoon, are Ramsar listed. The wetlands are designated as Crown Land for conservation purposes and managed by Parks Victoria.

The saltmarsh communities had been diminishing because of urban encroachment (the rapidly expanding City of Wyndham is on their doorstep) and associated decreasing water quality, as well as introduced exotic flora species. One of the major aims of this project is to engage the local community in practical conservation works to change attitudes about wetlands and their values. Working with the university sector of RMIT, volunteers have been involved in trialing and monitoring the re-establishment of saltmarsh communities. There has been significant saltmarsh regeneration as a result of removing large areas of the invasive woody weed boxthorn (*Lycium ferocissimum)*. The results have been immediate. A Parks Victoria Ranger commented that *"the Revive volunteer teams have progressed our Weed Management Action outcomes by up to 3 years in just over 10 months – providing increased food supplies for many birds"*.

Milang Wetlands: changing attitudes

(Contributed by Karyn Bradford from Milang 2005 Inc)

Milang is the only town on the shores of Lake Alexandrina, 76 km south-east of Adelaide, with a population of about 350. Lake Alexandrina (a Ramsar site) is a large body of water at the end of the Murray Darling Basin immediately before the Murray river flows around Hindmarsh Island and out to sea at Goolwa. Over time the foreshore area was filled in and turned into a recreation area and caravan park. What remained was an area of samphire swamp bounded by the main street of Milang, the caravan park and holiday shacks. The swamp became the town rubbish dump.

The community wanted to clean up the 'smelly swamp' but environmentalists protested because of its importance for a small migratory bird called Japanese or Latham's snipe (*Gallinago hardwickii*). This bird caused the locals considerable annoyance until a process began to change attitudes.

The wetland was re-fenced around the perimeter by Revive volunteers to give a clear message that it was a special area and valued. Over the next year, Revive teams, helped by the local community, completed 640 metres of post and rail fence, planted 200 trees, weeded 1.2ha and built 500 metres of track.

At this stage a funny thing began to happen. Instead of grizzling about the smelly swamp, members of the community started proudly puffing out their chests instead. Our smelly swamp was transformed into a wonderful wetland because the volunteers had helped to fence it, the little Japanese Snipe were coming each year to stay in it, and furthermore we are internationally important. Once people understood the importance of the wetland everyone was supportive.

The most important thing about the Milang Wetland project is that the needs of the community have been considered together with the needs of the environment. Residents and visitors to Milang now value our wonderful wetland.

Removing boxthorn at Cheetham Wetlands. Photo: Andrew Craig

Towards the protection and management of hanging swamps on the Somersby Plateau, Central Coast, NSW

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Upland wetlands, commonly known as hanging swamps, are scattered throughout the Somersby Plateau and depend on groundwater to maintain their floristic diversity. Although such communities are limited in areal extent, they provide islands of distinct vegetation assemblages somewhat different to the surrounding vegetation community. While not currently protected legally, these hanging swamps are unique ecological communities, providing potential habitat for threatened species such as the regent honeyeater, the red-crowned toadlet, the Adams emerald dragonfly, and a number of threatened and rare plant species. Although a wealth of knowledge currently exists on the biology and ecology of hanging swamps in general (eg Holland *et al.* 1991; Keith & Myerscough 1993; Kodela *et al.* 1996), little work has been done on the swamps of the Somersby Plateau. Some survey and broad-scale mapping has been completed for both Gosford and Wyong Councils, but there has been no investigation into why certain forms of hanging swamp occur in different locations.

Threats to the hanging swamp communities include land clearing, weed invasion, alteration of hydrology due to road building and landfilling, extractive industries, and pollution by nutrients from adjacent land uses (eg chicken farms, septic systems and nurseries). Although these threats have been identified, little is known of their extent and effects on these ecosystems.

The Central Coast Community Environment Network (CCCEN – see article by Robin Meldrum p.20 in this issue) has secured a NSW Wetland Action Grant to investigate the biodiversity and management of these hanging swamps. Its main purpose is to gain an understanding of the floristic assemblages present within hanging swamps on the Somersby Plateau and to increase the conservation status of this vegetation community. More specifically, the project aims to:

Banksia robur, B. oblongifolia, *and* Hakea teretifolia *over a sedge understorey at Strickland State Forest. Photo: Stephen Bell*

- Understand the current distribution of hanging swamps of the Somersby Plateau
- Assess their conservation status
- Understand the associated plant species (to enable statistical comparisons with plant species found within hanging swamps in the Blue Mountains and Watagan Mountains)
- Understand the influence of fire on floristic diversity of these hanging swamps
- Understand the plants that store their seeds in the substrata of these hanging swamps
- Raise community awareness of the biodiversity value associated with hanging swamps
- Develop an integrated and strategic approach to natural resource management linking the community and government agencies.

Impacts of fire

In the past, illegal flower pickers annually burnt a number of hanging swamps to promote the flowering of Christmas bells (*Blandfordia grandiflora*) to use in the cut flower industry. While this practice has now all but ceased, the problems of frequent fuel reduction and asset protection burns are a continuing concern. Fire on the Somersby Plateau is a constant threat to hanging swamps, with few of them escaping fire intervals of between 5-10 years. How has such a fire regime influenced the floristics of these hanging swamps? To this end, part of the grant will support an Honours project at the School of Applied Sciences at the University of Newcastle. Fieldwork will be done by Jason Parsons in a number of hanging swamps representing various periods of time since the last fire event. The floristic diversity and other environmental factors such as soil moisture content will be compared between sites to determine patterns in floristic composition as related to fire history. The ultimate goal of this study will be to describe the floristic variance that may exist between hanging swamps at a landscape level to ensure all forms are adequately protected, and to describe the role fire has played in shaping hanging swamps.

Floristic diversity

Preliminary studies into the floristic composition of the hanging swamps of the Plateau have indicated that there is a high level of diversity between different swamps. Four distinct variants were recognised in a broad analysis in the Gosford area (Bell, 2004), and it is likely that others will be delineated following the study described above:

1. *Leptospermum polygalifolium – Gleichenia dicarpa* hanging swamp
2. *Gymnoschoenus sphaerocephalus – Banksia robur - Sprengelia incarnata* hanging swamp
3. *Banksia ericifolia – Hakea teretifolia – Glechenia dicarpa – Callistemon citrinus* hanging swamp
4. *Lepyrodia scariosa – Schoenus brevifolius – Lepidosperma forsythii* hanging swamp

Rare, threatened and uncommon flora

A number of rare or threatened plant species occur within or in close proximity to the hanging swamps. The nationally rare (ROTAP 3RCa) *Gonocarpus salsoloides* is present in many of the swamps, often forming large mats within and over other ground vegetation. This scrambling herb occurs between Port Macquarie and Royal National Park, and is particularly evident within the wider Sydney area. In several locations, the New South Wales listed endangered *Hibbertia procumbens* is present around the edges of hanging swamps, typically in small localised sandy deposits, although more often this species is found in *Banksia ericifolia/Angophora hispida* scrub in lateritic soils (Bell, 2001). Other species of regional significance, such as those known only from swamp environments (eg: *Lepidosperma limicola, Goodenia dimorpha* var. *angustifolia, Almaleea paludosa*) are also common in many of the hanging swamps.

Raising community awareness

A portion of the allocated funding is also being used to raise community awareness of hanging swamps on the Somersby Plateau. Workshops and field outings have been arranged through local community groups and public schools, and a promotional brochure has been produced outlining the biodiversity of hanging swamps and its importance. An information stall was also prepared by the CCCEN at the Flora Festival in Gosford to draw attention to the hanging swamps in the area. Over the past twelve months a series of community workshops have explored the link between Aboriginal heritage and hanging swamps. These workshops have been keenly attended by participants intrigued by the concept of hanging swamps and eager to experience cultural awareness from the local Darkinjung perspective.

This collaborative approach between community, government agencies and education addresses terrestrial biodiversity and native vegetation targets outlined in the Catchment Management Boards of the Central Coast and the Hawkesbury/Nepean.

The NSW endangered Hibbertia procumbens *commonly occurs in close proximity to hanging swamps. Photo: Stephen Bell*

Further information on the hanging swamps project can be obtained from the Central Coast Community Environment Network on 02 43494757.

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Hakea teretifolia, *a common component of most hanging swamps on the Somersby Plateau. Photo: Stephen Bell*

Wastelands to wetlands: saltmarsh conservation at Sydney Olympic Park

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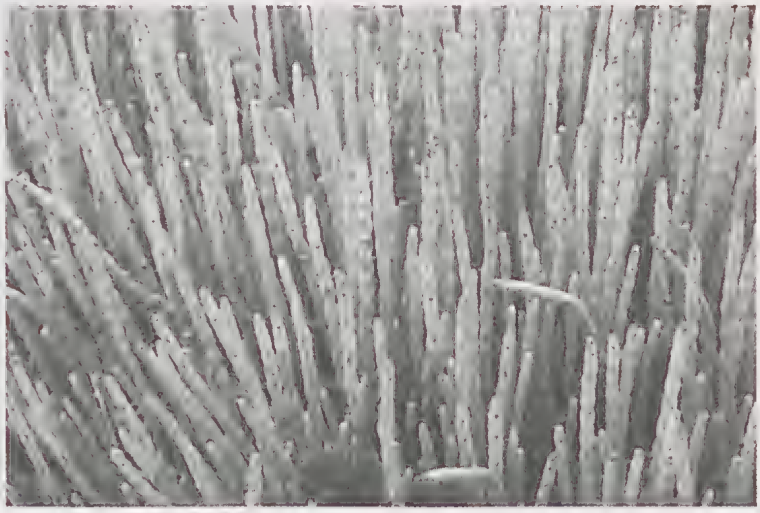
Sydney Olympic Park contains diverse and ecologically significant vegetation communities that provide habitat to a variety of unique flora and fauna species. Conservation and biodiversity have been incorporated into planning, design and construction of the landscapes. The 640 hectare park has been transformed over the past 10 years and now includes 425 hectares of constructed and remnant parks, reserves and wetlands.

In encouraging biodiversity and conservation, Sydney Olympic Park has become a refuge for plant and animal communities that are poorly represented within the Sydney region. The Sydney Olympic Park Authority currently manages 160 hectares of estuarine habitat along the Parramatta River and Haslams Creek, characterised by grey mangroves (*Avicennia marina*) and saltmarsh species including *Sarcocornia quinqueflora*, *Halosarcia pergranulata*, *Suadea australis* and *Wilsonia backhousei*. Some of these areas are completely constructed landscapes, where the design intent was to create saltmarsh communities.



Sarcocornia quinqueflora. *Photo: Sydney Olympic Park Authority*

The park now contains the largest saltmarsh community in the Sydney region, including approximately 2400m^2 of *Wilsonia backhousei* and 19.5 hectares of saltmarsh. *Wilsonia backhousei* is listed as "vulnerable" under the *NSW Threatened Species Conservation Act 1995* and Coastal Saltmarsh (encompassing Wilsonia and a range of other saltmarsh species) was consequently listed under the same Act as an Endangered Ecological Community.

The threatened saltmarsh plant Wilsonia backhousei.
Photo: Sydney Olympic Parks Authority

Conservation through remediation and redevelopment

The emphasis on saltmarsh protection and enhancement began during the redevelopment of the site for the Sydney 2000 Olympic and Paralympic Games. The conservation significance of saltmarsh generally, and particularly *Wilsonia backhousei,* was identified in the early stages of site redevelopment, many years before *Wilsonia backhousei* was listed as a threatened species and protected legally.

Wilsonia backhousei and its habitat were protected from disturbance within land set aside for the future Newington Nature Reserve. A nursery area was established within this land, and planted with *Wilsonia backhousei* and two other saltmarsh species of local conservation significance (*Lampranthus tegens* and *Halosarcia pergranulata*), salvaged from development and remediation sites.

Wilsonia backhousei became established in the nursery area, and along with other saltmarsh species such as *Sarcocornia quinqueflora* and *Suaeda australis*, was used as parent stock for propagation and planting within newly remediated parts of the park especially designed to sustain saltmarsh. Researchers monitored the success of saltmarsh conservation and propagation and advised on its management.

Long-term saltmarsh management

Today conservation and enhancement of saltmarsh at Sydney Olympic Park continues through a variety of initiatives, including the creation of a management plan for coastal saltmarsh, a mangrove management plan, continued propagation, planting and restoration of saltmarsh communities and funding of saltmarsh research projects.

SOPA Wilsonia Management Plan

The Authority has developed a Wilsonia Management Plan to ensure that the conservation of *Wilsonia backhousei* and Coastal Saltmarsh is in accordance with legal requirements and incorporates existing and future activities on the land that contain these species. Implementing the plan requires the active support of staff and contractors, who are trained in the locations and identification of saltmarsh, the threats to its habitat and best practices for working in and near saltmarsh. Protocols have been developed identifying best practices for horticultural activities, routine park management activities, propagation and planting, development or major maintenance works in adjacent areas, and tour and educational programs.

A monitoring program was also established under the Wilsonia Management Plan to guide adaptive management of the plant community. Initially in May 2002 the saltmarsh communities of Sydney Olympic Park were mapped to identify location, species and condition and to provide a baseline for long-term monitoring of saltmarsh distribution. Detailed quarterly monitoring of saltmarsh began in January 2004 and already we have recorded increases in overall saltmarsh extent.

Mangrove Management Plan

The proliferation of grey mangroves (*Avicennia marina)* threatens saltmarsh habitats and mudflats used by migratory shorebirds. The Authority has developed a five-year mangrove management plan, approved under the *Fisheries Management Act, 1994,* allowing for the conditional removal of mangroves threatening saltmarsh communities. Mangrove seedlings are periodically removed from key areas by trained contractors.

Juncus acutus management

This is a strongly competitive, highly invasive exotic rush that is present in estuarine areas. Seedlings and isolated plants are regularly removed from saltmarsh communities by trained landscape contractors. In some parts of the park *J. acutus* has infested large pockets of saltmarsh and despite being a weed, it forms a large portion of the available habitat. It must therefore be removed gradually; removing large amounts of this plant quickly would not only allow further weed invasion and erosion of bare areas, but would also remove important fauna habitat. A staged *J. acutus* removal program has been designed to remove the weed from heavily infested areas over five years. This program will start in January 2005.

Saltmarsh enhancement

Because of the constructed and altered nature of planted saltmarsh communities, some need on-going active management through continual propagation and planting of saltmarsh species, coupled with appropriate monitoring and refinement of techniques.

Scientific research

There is much still to learn about the biology, dynamics and specific environmental requirements of saltmarsh. The Authority has funded a PhD student from the University of Technology to investigate the biology of *Wilsonia backhousei* and *Lampranthus tegens*. Any knowledge acquired by this research will be incorporated into the Wilsonia Management Plan.

Saltmarsh conservation is a priority at Sydney Olympic Park. Management of saltmarsh requires adaptive management so that the implementation of the Wilsonia Management Plan and associated restoration activities can incorporate findings of field experience, monitoring and research projects.

Contractors participating in a "saltmarsh induction". Photo: Sydney Olympic Park Authority

Constructed wetlands: untapped potential for plant conservation

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In a landscape where many natural wetlands have been degraded, constructed wetlands (man-made free surface water wetlands) are commonly used for stormwater treatment and flow attenuation as part of a suite of stormwater management tools. Landscape amenity, biodiversity and habitat values may be readily incorporated in constructed wetland design. Conservation of locally endemic and threatened wetland species is a readily recognised attribute of constructed wetlands in the literature, where their advantages as a water treatment method are discussed (eg Young *et al*., 1998; Lawrence and Breen, 1998; Romanowski, 1998). However, most stormwater constructed wetlands have not made species conservation a focus. In this article we explore some ways that constructed wetlands might be able to enhance plant and ecosystem conservation.

The Riverina Institute of TAFE, at the National Environment Centre, Thurgoona runs a research project investigating sustainable water management, using constructed wetlands as one example. One aspect of the research considered design and planting of constructed wetlands. Using appropriately designed and engineered wetland slopes, grades and configurations, the right plants in the right places and at the correct densities can regulate water flow through the wetland allowing it to be treated to a quality suitable for recycling, reuse or discharge to creeks. It is through the use of plants in this way, that constructed wetlands offer an opportunity to add to local biodiversity values for flora and fauna.

Constructed wetlands may be designed to always retain some water or to dry out completely. Wetlands designed with wetting and drying cycles help immobilise phosphorus and may mimic natural systems and provide opportunities for threatened species conservation. Appropriately designed constructed wetlands offer an additional aquatic niche for locally threatened wetland marsh and bog species to grow and reproduce.

Subsurface constructed wetlands, such as reed beds, are sometimes used as a secondary treatment option for domestic onsite waste water treatment systems. On the North Coast of NSW, reed beds are commonly used as a secondary treatment device for septic tanks, before using the treated water for watering gardens. These systems offer an additional opportunity for wetland plant habitats, particularly for marsh and bog plants, because of the microhabitats created by a constant (or near constant) water supply.

Helping landholders to increase habitat around and in farm dams is another potential area for indigenous plant conservation. The Landcare movement has encouraged planting and fencing of farm dams (and waterways). But few farmers have given priority to planting local provenance and endemic species. There is considerable potential for helping farmers to focus on locally sourced and threatened species, as well as to modify and enhance farm dams to more closely resemble and emulate wetlands, bogs, marshes etc.

The findings from the Sustainable Water Resource Management project will highlight the need and opportunity for conservation of "at risk" wetland plants in the design and promotion of constructed wetlands. However, there is a need for a reliable supply of suitable (ie locally sourced and threatened) wetland plants, not only for initial planting, but also to allow the constructed wetlands to be maintained regularly.

Constructed wetland series at Riverina Institute of TAFE National Environment Centre. Photo: Gerard Lawry

We see a role for the Australian Network for Plant Conservation in raising awareness of the potential for plant conservation using constructed wetlands and around farm dams. There is therefore an opportunity for ANPC members to work with local government, nurseries and local seed banks, Catchment Management Authorities, developers, consultants and others to build constructed wetlands and ponds to increase the use of local provenance and endemic species in new and refurbished constructed wetlands. Propagation of "at risk" species for use on a commercial scale could be particularly beneficial for plant conservation and the maintenance of biodiversity.

More details of the research will be available in the published papers, which are due for release early in 2005.

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Sustainable grazing and samphire wetlands

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Traditionally, landholders have been encouraged to fence their wetlands off from stock, but recent observations suggest that removing grazing could actually reduce the habitat value of certain samphire wetlands. This article describes a new study, supported by the River Murray Catchment Water Management Board, the Goolwa to Wellington and Coorong District Local Action Planning (LAP) Groups, the SA Department for Environment and Heritage (DEH) and local landholders, which aims to determine which type of grazing regime is best for plant diversity and wading bird habitat in these areas.

Background

The Goolwa to Wellington Local Action Planning (GWLAP) Group, Coorong District LAP Group and the DEH work with landholders and community groups around the Coorong & Lower Lakes (South Australia) to protect, rehabilitate and sustainably use this Ramsar wetland site (see the article on page 3 for more information on Ramsar sites). The project provides technical and financial support for a range of activities such as revegetation, fencing remnant vegetation/wetlands and stabilising eroding lakeshores. Samphire wetlands are an important habitat found around the lower lakes, and have been targeted for their unexpected diversity. As well as the obvious salt-tolerant genera of *Sarcocornia* and *Halosarcia* in the drier zones, the edge zones can support the regionally threatened *Gahnia filum/Samolus repens/Schoenoplectus pungens* communities, and the brackish submerged zones can host *Crassula helmsii* and *Myriophyllum caput-medusae,* also listed as threatened in the region.

Vegetation sampling prior to altering grazing regimes at the first trial site on Wyndgate. Photo: Jem Tesoriero

Because grazing is the major land use around the Coorong & Lower Lakes, working with landholders to exclude stock from wetlands and improve grazing management is a high priority. Unfortunately, very little information exists to guide grazing management around the lakes and grazing practices vary greatly.

Although there are some clear examples of the degradation that can be caused by inappropriate grazing, the effects of grazing and its potential benefits as a habitat management tool quickly become evident when stock are totally excluded from wetland areas. In many cases following stock exclusion, the vegetation type changes dramatically and the low open samphire/herblands that form some of the most important habitat for migratory waders, are replaced by tall stands of *Phragmites australis* and dense *Paspalum*. In addition to forming dense mono-stands along the waters edge, these species are also notorious for their ability to block wetland inlets and outlets and compromise water quality.

Trials

To demonstrate and quantify the effect of different grazing regimes on vegetation, soil condition and the habitat values of the Lower Lakes, the Local Action Planning Groups and DEH are working with the River Murray Catchment Water Management Board (RMCWMB) and local landholders to establish a series of grazing trial sites.

Trial sites will be divided into three sections, each running from the inundated wetland back across the low-lying samphire/herbland and up to the pasture on higher ground. The first section, which will be open to the rest of the paddock, will investigate the effect of current grazing practices (grazed throughout the year). The second section will use removable fencing to enable stock access for pulse grazing in summer only. The third section will be permanently fenced for total stock exclusion. Vegetation diversity, vegetation community/habitat type and soil condition will be compared across all three treatments.

The initial trial sites are being set up on the Wyndgate property on Hindmarsh Island, near Goolwa, South Australia. Wyndgate is managed by National Parks and Wildlife SA, and although it has a long history of grazing, many important wetland plant communities remain, including low-lying samphire areas, succulent herbs/sedges along the littoral zone, emergent macrophytes such as reeds and rushes and a diverse range of submerged aquatic macrophytes, including several charophytes. All zones have been affected by pugging and grazing, yet are still relatively diverse.

The techniques used for monitoring the changes in vegetation following different grazing regimes, which are taken from 'Your Wetland: Monitoring Manual' (Tucker, 2004), involve using quadrat, line intercept and photopoint methods to determine the change in plant composition over time. The monitoring program uses the resources and expertise of the RMCWMB community monitoring program.

Conclusion

The trials being set up around the Lower Lakes will lead to more sustainable grazing practices and better protection of the valuable samphire wetland habitat. For more information on the grazing trials project, please contact Jem Tesoriero from the Goolwa to Wellington LAP on (08) 8536 4551.

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Stock grazing at the second trial site on Wyndgate, prior to fencing. Photo: Jem Tesoriero

Desert wetlands – you must be joking?

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When I started telling people I had a job surveying wetlands in central Australia the responses varied from disbelief to derision: "*What wetlands?*" was typical and "*Well, that'll be quick*" was common. That was 1999 and Alice Springs and surrounding regions had experienced below average rainfall. Then we had two spectacularly wet years: *instant wetlands – just add water.*

The wetlands inventory covered the arid part of the Northern Territory (south of 20° latitude). In the context of world deserts, the rainfall is only moderately low (278 mm annual mean in Alice Springs). However, the rainfall is also extremely unreliable and droughts are common. Rainfall is most common in summer and includes episodic large events triggered by incursions of northern monsoons and/or low pressure systems from coastal cyclones. For example, Argadargada Station recorded 566 mm in December of 2000. While much of the rain just sinks into desert sands, there are many areas where runoff accumulates in rivers and basins. The resulting wetlands vary greatly in character and include water holes, rivers, swamps, clay pans, salt lakes and springs. There is a corresponding variety in the plant species and vegetation communities of these wetlands. There are also some biologically significant artificial wetlands such as dams, sewerage ponds and overflowing bores.

The vast majority of wetlands are temporary. Some of these may experience inundation almost annually. However, there are many which hold water much less often. Some of the important swamps and salt lakes are filled less than once a decade. In this environment plants need special adaptations to cope. Many are annuals or short lived perennials that have long lasting dormant seeds. When inundation finally recurs the seeds germinate, sometimes creating spectacular displays of flowers and herbage as waters recede. An example is the herb *Mimulus prostratus* (monkey face), which was only known from four places in the NT prior to the inventory. During the survey, we found about 20 new locations for this species, and it was the dominant herb covering many hectares around the edges of a particularly large wooded swamp. *Isotoma luticola* is another small wetland herb that seems abundant if you are in the right place at the right time, even though it is regarded as nationally rare. Our survey showed that the right place is a river floodout or broad shallow swamp basin, and the right time is following a large inundation. There are many species, such as these two, which only occur in desert wetlands; yet although they depend on inundation, they are not aquatic.

There are relatively few aquatic and amphibious plants in desert wetlands. Some are widespread in temporary waters, such as species of *Marsilea* (nardoo) in freshwater swamps and claypans and *Ruppia tuberosa* in salt lakes. Some species are widespread in water holes after river flows but probably rely on semi-permanent waterholes to persist, for example *Myriophyllum verrucosum* (red water-milfoil). Some species are virtually restricted to permanent water bodies. The main distribution of many of these is outside of the arid zone but their presence at permanent waters in the desert highlights the special and unusual nature of these habitats. *Schoenoplectus litoralis* (river club-rush), *Imperata cylindrica* (blady grass) and *Phragmites australis* (common reed) are three such plants.

Intermittent swamp with lignum. Photo: Peter Latz

Some characteristic species of desert wetlands are longer lived perennials, including trees and shrubs that tolerate periodic inundation. *Melaleuca glomerata* (inland teatree), and various species of *Eucalyptus* (coolabahs and red gums) are common examples. *Muehlenbeckia florulenta* (lignum) is also widespread but is relatively uncommon in central Australia. In contrast to these woody plants, *Eleocharis papillosa* is a perennial sedge which dies back to a tuber in dry times. It is only known from eight locations, all in the inventory area, and is listed as vulnerable to extinction due to encroachment by *Cynodon dactylon* (couch grass).

Encroachment by introduced plants is the main threat to the naturalness of wetlands across the arid part of the Northern Territory. This includes grasses such as couch and buffel (*Cenchrus ciliaris*) as well as shrubs and trees such as Athel pine (*Tamarix aphylla*).

The survey work for this study was a career highlight. The coincidence of Natural Heritage Trust funding with the highest rainfall in 25 years created an incredible opportunity. Our survey team saw some fascinating and beautiful places at their best. So no, I'm not joking. Wetlands in central Australia are a happening thing, but you have to be in the right place at the right time!

More information from the inventory will soon be available in the project report:

Duguid, A., Barnetson, J., Clifford, B., Pavey, C., Albrecht, D., Risler, J. and McNellie, M. in prep. *Wetlands in the arid Northern Territory. A report to Environment Australia on the inventory and significance of wetlands in the arid NT.* Parks and Wildlife Commission of the Northern Territory. Alice Springs.

Two wetlands in the Gulf region: not listed, but not forgotten

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Unlike the highly disturbed wetlands in more settled parts of Australia, wetlands in the Gulf Plains bioregion of Queensland are still in relatively intact condition. This terrestrial bioregion surrounds the Gulf of Carpentaria, into which numerous major rivers of north Queensland and eastern Northern Territory drain. In this report we describe the flora of two wetlands which we visited in June 2003 and discuss some management initiatives for these relatively intact wetlands.

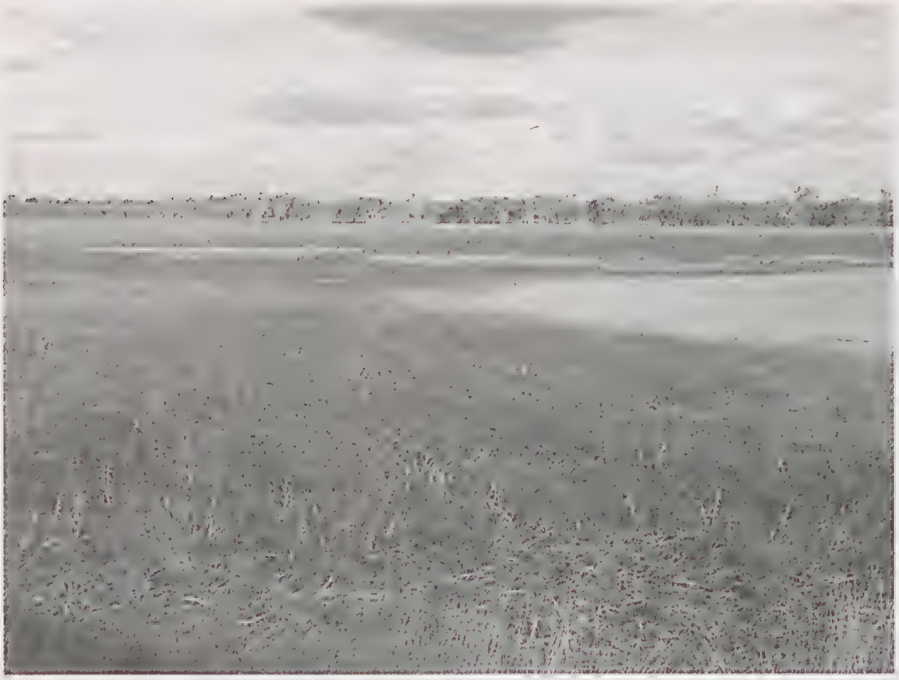
The two wetlands reported on here lie close to, but just outside, the adjacent Mitchell Fan Aggregation described by Blackman *et al.* (1999) in the 'Characteristics of Important Wetlands in Queensland', However, their scientific interest and conservation value are no less than the listed wetlands.

These wetlands are clearly visible on satellite imagery and indicated on the Kingfish Lagoon 1:100,000 scale topographic map. The wetlands are associated with a natural sand levee formed from abandoned overflow channel deposits of the Quaternary period that impedes freshwater surface flow. This occurs in a landscape that has low elevation, about 60 metres above sea level, and a very gentle slope, with a fall of only 20 metres over a distance of about 30 kilometres. Consequently, the remaining levee, with a height of only one metre, impounds wetlands of up to 40 hectares in extent.

The wetlands are mapped on regional ecosystem mapping of the Walsh 1:250,000 map sheet (Fox and Wilson, 2003).

Vegetation on the levee is dominated by woodland of *Corymbia polycarpa* and *C.dallachiana* with a shrubby understorey of *Melaleuca nervosa*, *Ficus opposita*, *Erythrophleum chlorostachys*, *Glochidion* sp., *Brachychiton diversifolius* subsp. *orientalis* and the striking *Pandanus somersetensis* (see photo). Whilst this community appears

Pandanus somersetensis. *Photo: Gary Wilson*



Lacustrine wetland in the Gulf Plains bioregion. Photo: Gary Wilson

relatively intact, the frequent occurrence of weeds in the grassy ground layer indicates grazing disturbance. Grasses present include *Aristida* spp., *Heteropogon contortus, Dactyloctenium aegyptium, Chloris lobata, Digitaria ciliaris* and *Bothriochloa bladhii.* Weeds present include *Hyptis suaveolens, Triumfetta rhomboidea, Crotalaria goreensis, Senna occidentalis* and *Chamaesyce hirta.* The abundance of *H.suaveolens* on these sand ridges is a consequence of cattle using this high ground for refuge during the floods of the wet season.

One of the two wetlands has been slightly modified and the other remains natural. The natural pre-existing levee of the larger of the two wetlands has been artificially raised with a low earth embankment 1.3 km long to impound water for longer periods and act as a watering point for cattle. This embankment is visible on satellite imagery. The presence of weeds on the sand levee is obvious, but the impact of grazing on and in the wetlands is not clear. Around the margins of the wetlands pigs have dug up large areas to feed on the roots of various aquatic plants.

The wetlands are fringed by low trees of *Melaleuca viridiflora*. The ground layer around the margins includes *Oryza meridionalis, Panicum trachyrhachis, Eragrostis spartinoides, E.fallax, Ludwigia octovalvis* and *Pseudoraphis spinescens*. Notable amongst other plants around the margins are *Stylidium delicatum, Eriocaulon carpenatariae, Eriocaulon* sp., *Marsilea mutica, Cyperus aquatilis, Heterachne gulliveri* and *Monochoria cyanea.* Tall sedges include *Cyperus decompositus* and *C.holoschoenus*. Aquatic species include *Caldesia oligococca* var. *oligococca, Myriophyllum dicoccum, Nymphoides indica, N.crenata, Nymphaea* spp. and *Eleocharis* sp. (Kapalga Billabong J.H. Taylor JT273). A number of herbarium collections were made at these wetlands.

In addition to collecting data on the plants, two bird surveys identified 46 species of birds including black-necked stork (rare under the Queensland *Nature Conservation (Wildlife) Regulation 1994)* and more than 2,000 magpie geese.

The species present in these two wetlands are representative of a number of lacustrine wetlands (wetlands with permanent or ephemeral lakes in their centres) in the Gulf region that vary in extent and depth (see photo). While these wetlands are not threatened at present, the challenge is to maintain their condition under a land management regime dominated by cattle grazing. This has prompted community groups to move towards cooperative long-term wetland protection. Groups such as the Northern Gulf Resource Management Group and Southern Gulf Catchments have large areas of important wetlands that they wish to retain in good condition to avoid the need for costly and difficult rehabilitation. The Northern Gulf Resource Management Group, using funding from the Natural Heritage Trust, has developed a program for granting funds to landholders to maintain individual Gulf wetlands. In addition, the group has funding to develop generic guidelines for the management of Gulf wetlands in the context of grazing. In addition the Queensland Environmental Protection Agency (EPA) has commenced the Wetlands Conservation and Management Implementation Plan, which includes inventory and classification of the state's wetlands. The mapping and classification of these two Gulf wetlands will be integrated into the EPA wetland project.

Contact Jane Tincknell, Northern Gulf Grazing Lands Officer on (07) 40621330 or by email at glo.ngrmg@bigpond.com for information about the wetland grants.

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Protecting NSW coastal lowland forest: the Central Coast Community Environment Network

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Since 1996 the Central Coast Community Environment Network has worked to conserve the biodiversity of wetland areas. The organisation has coordinated projects to protect the NSW coastal lowland forests and the hanging swamps on the Central Coast Plateau (see the article by Bell *et al.* in this issue). These projects were developed in response to the enormous pressure from urban and rural development on remnant vegetation.

Voluntary community support created the vision and established the framework for these projects. Over the past three years, funding from the State Wetlands Advisory Committee has enabled the implementation of research and community education in these lowland and upland wetlands.

This article describes one of our initiatives, the Protection of NSW Coastal Lowland Forest Project, which has made a significant contribution towards the recent recognition of NSW coastal lowland forests as Endangered Ecological Communities under the NSW Threatened Species Act. These coastal lowland forests form part of the forested and treeless wetland communities found throughout the coastal floodplains of NSW.

Coastal Lowland Forests/Swamp Mahogany Project

The Protection of NSW Coastal Lowland Forest Project followed on from a study of the floristic patterns within NSW swamp mahogany (*Eucalyptus robusta*) communities (Anderson & Asquith, 2002). Swamp mahogany is a well known species within the coastal lowland forests and has been described as a 'keystone species' (Benson & McDougall, 1998; Aquatic Ecological Investigations, 1999). Its winter flowers provide a vital foraging resource for a number of threatened species, including swift parrot, regent honeyeater and grey-headed flying fox, listed under national and state legislation. A number of threatened plant species also occur within these coastal lowland forests, including the grass *Alexfloydia repens*, a herb *Maundia triglochinoides* and orchids *Phaius australis* and *P. tankervillei.*

The CCCEN study of the NSW swamp mahogany communities collected and analysed data from all local government areas along the NSW coastline. The initial aim was to document characteristics of each remaining stand of *Eucalyptus robusta.* Included within the resultant database were: the size of remnants within reserves, key threatening processes, importance to threatened species and definitions of the vegetation communities. Funding by the State Wetlands Advisory Committee in November 2000 allowed for a significant expansion of the project. The conservation focus of the project changed from a wholly qualitative approach that relied on the interpretation of anecdotal evidence and relevant vegetation reports, to a quantitative approach which used plot data, GIS applications and multivariate statistics. The aims of the project were therefore expanded to:

Swamp mahogany flower. Illustrated by Lamese Larney 2002

1. Develop a series of definitions of a vegetation community for Swamp Mahogany and/or Coastal Lowland Forests that meets the requirements of the Threatened Species Conservation Act (1995)
2. Define whether these communities are either 'critical habitat' or 'endangered'
3. Quantify how much of this forest remains, and if these remnants are sustainable

4. Identify the regional distribution of these forests and how much is protected in national parks or other conservation reserves
5. Investigate the importance of these forest communities to the survival of threatened species, both migratory and sedentary

The scope of the project was also broadened out from just swamp mahogany communities to include all tree-dominated vegetation communities on poorly drained alluvial or aeolian soils (largely wind-deposited sediments, eg lake and ocean coastline beaches, alluvial fans, and farmland where topsoil has been disturbed by cultivation).

A hanging swamp in the Mangrove Mountain area of the Central Coast. Photo: Jason Parsons

The work of this study has since been taken up by the NSW National Parks and Wildlife Service. NPWS reworked the data by including additional datasets and re-analysing the results. These results were then used by the Scientific Committee to make a Final Determination to list the following coastal lowland forest communities as Endangered Ecological Communities under the NSW Threatened Species Act:

- River-Flat Eucalypt Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions,
- Subtropical Coastal Floodplain Forest of the NSW North Coast bioregion,
- Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South East Corner bioregions, and
- Swamp Sclerophyll Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions.

The listing of these ecosystems helps to protect the declining lowland wetland communities along the NSW coastline. This legislation will also protect swamp mahogany, thus having a flow-on effect towards the conservation of biodiversity dependent on that species.

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FUNDING OPPORTUNITY

Envirofund - Round 6 Now Open

The Australian Government Envirofund is the local action component of the Australian Government's $3 billion Natural Heritage Trust. It provides funding to communities to undertake local projects aimed at conserving biodiversity and promoting sustainable resource use. Funding is currently available through Envirofund Round 6 with applications closing on 18 February 2005. For further information visit http://www.nht.gov.au/envirofund/

The National Competitive Component of the Natural Heritage Trust - Round 2 Now Open

The National Competitive Component is intended to support new, innovative and pilot projects that will lead to significant improvements in the sustainable management of natural resources and will most effectively improve regional NRM delivery. Applications close on 18 February 2005. For further information visit http://www.nht.gov.au/ncc/index.html

A coordinated approach to wetland management on the Eyre Peninsula, South Australia

Tansy Boggon, Wetlands Project Officer, Eyre Peninsula Wetlands Committee, South Australia.

The importance of wetlands and the need to protect these significant ecosystems is increasingly acknowledged. However, on the Eyre Peninsula the effective management of wetlands is currently constrained by the limited available information on wetlands and personnel to deliver on-ground works and provide extension to the community. In light of this, a project was developed in collaboration between government agencies, natural resource management groups, local government and community members, forming the Eyre Peninsula Wetlands Committee.

The first phase of this project is to collate existing information on wetlands on the Eyre Peninsula and to provide a gap analysis. This information will guide formulation of management plans for wetlands, community education plans and on-ground works in the region, which will also be developed and implemented as part of the project. Baseline data of biological and physio-chemical characteristics will be collected for wetlands considered of importance within the region and an ongoing monitoring framework will be developed, which will have a strong emphasis on community involvement. Community members will be educated and trained in wetland monitoring to ensure the monitoring of wetlands will continue after the life of the project. Information generated from this project will be widely available to aid wetland management in the region by different stakeholders.

For future information or comments contact the author on tansy@epcatchment.com.au.

Wet and wild: The National Wetland Trust, New Zealand

Gordon Stephenson, Chair of The National Wetland Trust; Email: lorax@xtra.co.nz

Anyone interested in wetlands in New Zealand soon realises that the advocacy for wetlands, and information about them, is scattered among many organisations, with no one focus. There are the Department of Conservation, National Institute for Water and Atmospheric Research, Landcare Research, universities, Fish and Game Council, Ducks Unlimited, the Ministry for the Environment, NGOs like Forest and Bird, and others.

A group of wetland enthusiasts from the Waikato region of North Island therefore decided to form a trust (The National Wetland Trust) to become the major voice for wetlands throughout New Zealand. Wetlands have always been seen by the public as second class citizens. We aimed to change that attitude. The early meetings thrashed out our functions, leading to the drafting of a policy document, a necessary but tedious process. That is all behind us and we are now in business.

We started by raising funds to establish a National Wetland Centre. After considerable research of sites, we now own a small property at Rangiriri, a small settlement on the main North/South highway (SH1) between Auckland and Hamilton in the North Island. Rangiriri is already a minor tourist destination as the site of a major battle in the land wars of the 1860s, but it is also adjacent to a peat lake, and the Ramsar wetland of Whangamarino is nearby.

The Centre will serve several functions. Our concept plan, drawn up by major consultants, calls for information pavilions to be set among ‘gardens’ containing plants connected to the major wetland types in NZ. There are even plans for a small geothermal section. Having just completed a business plan showing the financial feasibility, the development of the Centre now depends on raising the NZ$2-$3m needed to build a world class facility.

The Centre will not only cater for the casual visitor and busload of tourists, it will assemble a library of all known NZ wetland data, run wetland management courses for landowners and local body personnel, and classes for schools. There will also be a small research facility.

The Trust has established its first wetland trail, a forerunner of a motorists' trail that will eventually extend over the whole country. We have registered a distinctive trail logo of a stylized pukeko, a true wetland bird. A trail booklet is in the last stages of production.

Much of New Zealand has a wet climate, and there were once very extensive wetlands. Only about 10% remain, but those remnants include several high-value, extensive and unusual examples. We are almost ashamed that NZ has currently only five wetland sites registered under the Ramsar Agreement (see p.3). We are therefore starting to identify potential new sites that fit the Ramsar criteria. There are many. We are also in the final draft stages of producing an information booklet on all the existing Ramsar wetlands.

A national Wetland Policy was last prepared in the mid-1980s. An update is long overdue and we have started to advocate for a new one. Then there are issues of wetland management with national implications that need following-up. It is often difficult to avoid being pulled into what are essentially local issues, best handled by local people.

We are still a young organisation, driven by the enthusiasm of youth, but trying to have maturity of judgment in what we become involved with. New Zealand's wetlands deserve a strong voice speaking for them.

We can be found on www.wetlandtrust.org.nz and we publish a newsletter, 'Wet and Wild'.

Community-led conservation in New Zealand gets organised!

Mike Peters

New Zealand Ecological Restoration Network, PO Box 9000, Christchurch. Email: office@bush.org.nz

Conservation groups in New Zealand are making good use of the Internet to spread the news of their success and to share information. Since 1998 an effort has been underway to build a cooperatively owned web portal that provides a big window on ecological restoration.

The New Zealand Ecological Restoration Network (NZERN) is a nationwide network of practitioners. Landcare groups, farmers, Maori tribes, youth clubs, conservation groups, native plant nurseries and pest control contractors make up its members. Members share a common involvement in habitat protection and restoration. The network started in Christchurch in 1998 and since then has spread out in all directions. After covering most of the South Island by 2000, it "jumped the ditch" to the North Island in 2001. These days, the leaders of local groups with restoration projects run the regional NZERN branches. Regional phone books called "Restoration Directories" are produced which list all projects, native plant nurseries and organisations involved. These directories are widely distributed and enable people to contact each other directly. Field days, which enable training and sharing of information by participants, are also organised.

NZERN volunteers have built and operate a centralised Internet-based information system. This system is called Pipi and has been very popular, receiving up to 300,000 hits a month on the main website. NZERN has ended up being overwhelmed by its success and efforts are now underway to build a comprehensive "Enterprise" system that can support thousands of registered users. It will have many modules, including GIS mapping, a content management system, and groupware and decision support tools. These web-based tools will help a user choose plants for planting and find out about controlling weeds, propagating native plants, and monitoring changes in native habitat. Pipi is due to be completed in July 2005. Growing recognition of this effort has led to funding by government agencies and a recent donation of GIS software by ESRI, including ArcIMS. Users will be able to import and export their own information and choose to make it available to others.

Since the advent of the Internet, only 5% of information is now being published as books or magazines. Along with the popularity of programs like Access, this has spawned the proliferation of databases with ensuing duplication and a mishmash of standards. This "Tower of Babel" has led to the saying, 'data integration or disintegration'. NZERN volunteers are making great efforts to ensure international standards are used where they exist. But complicating this is a lack of integration among all government organisations at national and local levels. NZERN plans to enable data sharing using XML based web services with as many organisations as possible. A cause for hope has been the international efforts of the Taxonomic Databases Working Group (TDWG) to establish international standards for exchanging biological based information.

The NZERN website is www.bush.org.nz

TDWG website is www.tdwg.org

The impact of climate change on the distribution, function and condition of alpine peatlands on the Bogong High Plains, Victoria

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The mossbeds of the Bogong High Plains in Victoria represent a rare and restricted vegetation type that provide critical ecosystem services, and are of major importance to overall catchment health. It has been postulated that the mossbeds have contracted a great deal since European settlement, with some suggesting that up to 50% have disappeared, being replaced by other vegetation types (Costin *et al.,* 1959; Wimbush, 1970). However, there is some indication that there has been some recovery since grazing pressure has been reduced (McDougall, 2003; Wahren *et al.,* 2001). Nonetheless, the long-term impact of climate change on these mossbeds is still unknown.

I have commenced a PhD project exploring the potential impacts of climate change on the condition, function and distribution of peatlands on the Bogong High Plains. Ecological models will be used to describe the current distribution of the peatlands, and also to make predictions of distribution changes under a number of different management and climate change scenarios.

The process of degradation at the level of individual peatlands, and the way in which this contributes to degradation of the catchment, will be investigated. This will be carried out using aerial photo interpretation and field investigations. Vegetation change is very slow in alpine and subalpine landscapes, due to the short growing season and low temperatures. Aerial photo interpretation provides an opportunity to assess vegetation changes over a reasonably long period of time (from 1936 to the present), and to detect trends in vegetation patterns.

The models developed in this project will aid in the development of decision support systems for the management of the Bogong High Plains, and will help to set management priorities and constrain activities. Estimating the impact of management and climate change scenarios will form the basis of planning for the mitigation of these impacts.

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Tasmania's native riparian vegetation

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Native riparian vegetation plays an essential ecological and structural role as a link between aquatic environments and the land. Riparian vegetation can be found adjacent to and in watercourses including the riverbank; gullies and dips which sometimes run with surface water; wetlands on river floodplains that interact with the watercourse during floods; land above the high water mark where vegetation may be influenced by elevated water tables or extreme flooding; and estuaries.

Riparian vegetation is not only crucial habitat for birds, mammals and aquatic animals, but occupies a corridor of land that is much sought after for agriculture, house sites, recreational facilities, industrial sites and water storage for irrigation and town water supply. Survival of riparian vegetation is increasingly threatened by pollution, loss of substrate, channel modification, flow regulation, hydrological modifications and commercial enterprises (Australian State of Environment Committee, 2001).

Little is known about native riparian plant species, assemblages and their environmental needs and interactions; yet this knowledge is important if we are to make informed and appropriate decisions for conserving, restoring and rehabilitating riparian lands and ecosystems, and maintaining ecosystem services. In this article I describe some of the main findings from my PhD (Daley, 2003; Daley &

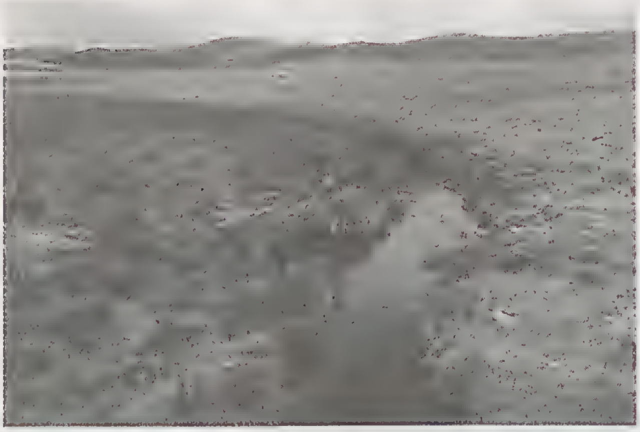

Fig 1: Community 2 Eucalyptus open-forest over Baeckea gunniana-Gleichenia alpine-Rubus gunnianus *sedgey-ferny closed-heath (treeless sedgeland variant at Lake Lea Creek). Photo: Elizabeth Daley*

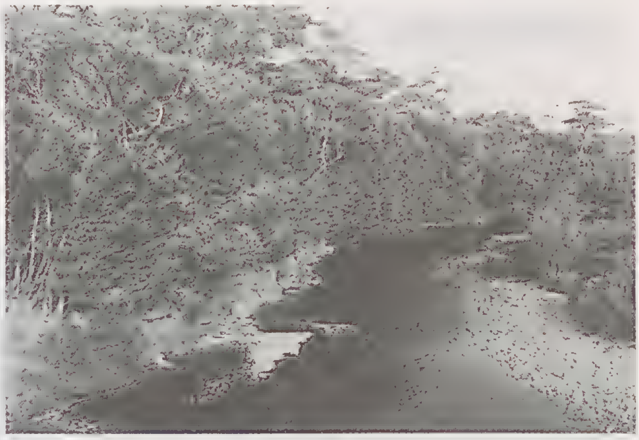

Fig 2: Community 21 Eucalyptus nitida *woodland over* Gleichenia dicarpa-Persoonia juniperina-Philotheca virgata *ferny closed-scrub (Lindsay River). Photo: Elizabeth Daley*

Kirkpatrick, in press), which looked at riparian plant communities across Tasmania.

I defined, mapped and described 21 riparian vascular plant communities using presence/absence data from 460 sites from relatively unmodified stretches of rivers and streams. Riparian communities have strong geographic patterns. Because plant communities were defined by unique plant groupings, many of the described communities have a wide range of structural expression. For example, Community 2 is called '*Eucalyptus* open-forest over *Baeckea gunniana-Gleichenia alpina-Rubus gunnianus* sedgey-ferny closed-heath'. The plants that characterise this community are *Baeckea gunniana, Gleichenia alpina, Oxylobium ellipticum, Rubus gunniana, Gymnoschoenus sphaerocephalus, Lomatia polymorpha* and *Allocasuarina zephyrea*. This community only occurs in the Central Highlands at altitudes between 700m and 100m. Most, though not all, sites containing this community have *Eucalyptus* trees in the canopy (Fig 1).

Nearly half of the native vascular flora of Tasmania is present in the sites, including a large number of conservation-significant species. Of the 857 native plant species I recorded during the field survey, 46 are listed in the Tasmanian *Threatened Species Protection Act 1995*, including the endangered species *Epacris apsleyensis, Discaria pubescens* and *Sagina diemensis*. I also found four undescribed species. In the drier, lowland parts of the state there are large areas with little or no native riparian vegetation remaining.

The species that characterise riparian communities are varied and are generally found in the middle and ground layers. Shrubs make up the majority of species in the riparian zone (Fig 2), followed by herbs and then graminoids (monocots other than grasses). The species richness of ferns, trees and grasses in the riparian zone is relatively low, though the representation of trees and ferns native to Tasmania is relatively high.

I found that the presence of native vascular species in the riparian zone and the distribution of native riparian floristic assemblages across Tasmania is strongly influence by altitude, rainfall, temperature, hydrologic and geomorphologic factors, and the vegetation itself. These factors account for differences between riparian communities in the cooler, wetter regions of the Central Highlands and, for example, those found in the drier coastal regions of eastern Tasmania. Studies conducted in Oregon, USA (Chapin *et al.*, 2002) and Poland (Wassen *et al.*, 2003) show that: 1) riparian vegetation communities depend on flooding flows; 2) the absence and presence of species and the variation in species composition of the vegetation was explained best by flood variables; and 3) river hydrology, together with nutrient release from the soil, has a strong influence on vegetation composition, species richness and productivity of riparian vegetation.

Native riparian vegetation has significant environmental values and plays a vital role in maintaining aquatic and terrestrial ecological processes and genetic diversity. If riparian vegetation is to retain high environmental, social and economic values, considerable strategic planning for its long-term management is needed at the local, catchment, state and commonwealth levels. The riparian zone is an area where the preservation of remaining native vegetation is by far the most cost effective strategy for management, as the current costs of reactive rehabilitation are high and future costs associated with preserving ecosystem services will be higher.

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"Phoenix flora": a post-fire discovery in the ACT

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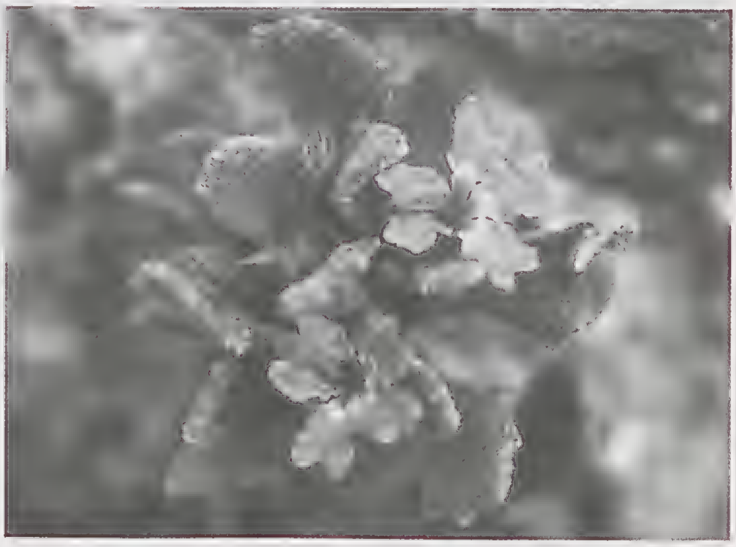
About 18 months after the Canberra 2003 wildfires, a group of botanists from the Australian Native Plant Society's (ANPS) Canberra Region found a mysterious plant species at a site in Namadgi National Park. This was a surprising find, given that botanists from the nearby Australian National University, University of Canberra, CSIRO, and the National Herbarium have been researching Namadgi's flora for many decades. It was especially surprising following the "devastating" wildfires, which in some areas really have done significant damage, particularly as a result of post-fire erosion of topsoil and seedbank.



Dampiera fusca *flower. Photo: Geoff Clarke*

The National Herbarium's Brendan Lepschi has identified the plant as *Dampiera fusca*, a species previously known only from a small number of sites in NSW and Victoria. This is a new genus for the ACT. The Namadgi National Park population is far larger than the other NSW population and is estimated to contain several hundred plants. However, all are of the same age class and it appears that inter- and intraspecies competition, especially from *Podolobium, Leptospermum* and *Kunzea* spp. is likely to reduce their number substantially over the next few years.

The conservation status of *D. fusca* was described as nationally Rare (3RC-) under the now lapsed ROTAP (Rare Or Threatened Australian Plants) classification (Briggs & Leigh, 1996) based on an assessment of its status undertaken by Alston *et al.* (1993). Its status is now being revised in the belief that it should be classified as at least Vulnerable under the Federal Environment Protection and Biodiversity Conservation Act and the NSW and ACT equivalents. A nomination to list the species as Endangered in NSW has recently been submitted. The species is already listed as Endangered under the Victorian Flora & Fauna Guarantee Act.

I would be glad to hear from anyone with knowledge that may assist the assessment of *D. fusca*'s conservation status. Please email me at steve.douglas@anu.edu.au or mail to Room 117, Building 48, School of Resources, Environment & Society, Australian National University, Acton, ACT, 0200. Further information is available in the Journal of the Australian Native Plants Society (Canberra Region) Vol.14(2) and in an article published in *The Canberra Times* on the 6th November 2004 which can be viewed at http://www.users.bigpond.com/stevemd/publications&articles.htm

Dampiera fusca *habitat. Photo: Steve Douglas*

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The 3rd IUCN World Conservation Congress

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The World Conservation Union (IUCN) coordinates over 500 conservation projects throughout the world, mostly in developing countries. It plays a critical role in setting standards, such as defining categories of protected areas, and since the 1980s has produced criteria and definitions for assessing the threat status of species.

The 3rd IUCN Congress was held in Bangkok from 15-25 November 2004. Over 6000 people gathered for this event from over 1000 member organisations. They included a mix of NGOs and government agency officials. Such a mix makes IUCN an unusual forum as it brings together disparate groups under one banner. Rarely do international conferences attract such an eclectic group of famous people. For example, the Queen of Thailand opened the Congress, which was also attended by the Princess of Japan, World Bankers, present and former prime ministers and presidents, current environment or natural resource ministers, senior public servants, and heads of numerous conservation organisations from around the world. There were also video links to the likes of Nelson Mandela and the rock singer Sting!!

Some highlights

It is not possible to summarise the 1000 presentations which came from over 140 countries on a myriad of topics ranging from threatened species to environmental poverty programs. Some of the most memorable events and facts for me included:

- An expert consensus reached by a number of world environmental organisations that if climate warming goes up by a global average of 2 degrees over Industrial Revolution levels (it is up O.5° at present) then species extinction will accelerate and there will be catastrophic disruptions to climate around the world.
- Sobering statistics just released from the IUCN 2004 Red List of Threatened Species: 32% amphibians, 23% mammals, 12% birds and 58% of coral reefs are threatened worldwide. Plant species statistics, as always, are harder to come by, reflecting the poorer state of knowledge and funding.
- Only a fraction of the plant species has been evaluated using the IUCN 2001 threat criteria; however, some plant groups have been assessed and 153 of the world's 618 conifers, and 153 of the 288 cycads are extinct or threatened.
- The software giant Oracle has given US$3 million to IUCN to re-vamp and improve the Species Information System (SIS) database of globally threatened species. This will allow SIS to be accessible on the Internet, include more information per species and link to other worldwide species databases.
- The *ecosystem approach* to nature conservation that is now part of the Convention on Biological Diversity has grown in importance in IUCN thinking and programs. This shift is paralleled in Australia's increased emphasis on ecosystems and habitat conservation, and at both levels raises the challenge of how best to retain and integrate species-level conservation efforts.
- Invasive species are on the rise worldwide, probably due to increased trade. For example, within one decade the shrub *Chromolaena ogorata* has invaded large areas of rhinoceros habitat in national parks in southern Africa, threatening to not only destroy whole ecosystems, but also local economies that rely on ecotourism.
- The Population Reference Bureau 2004 World Population Data Sheet shows an alarming continued increase in human population in Africa and Asia. Growing urbanisation is causing ever greater demand for consumer goods and pressure on natural resources.
- Jeffery Sax, Professor of Economics at Harvard University and advisor to the United Nations on the Millennium Development Fund, produced an array of statistics on the imbalances of expenditure by the USA, such as a 30:1 ratio of expenditure on the military versus the environment. If the US spent its pro-rata dues of 0.7% of its GDP, rather than the current 0.14%, on the Millennium Development Fund, it would deliver an extra $55 billion a year towards environmentally sustainable development worldwide.

A role for the ANPC?

The IUCN Species Survival Commission specialist groups have summarised their last four years of work in Issue 42 of the IUCN journal *SPECIES* (downloadable free from *http://www.iucn.org/themes/ssc/species/spec-int.htm*). It was disappointing not to see a contribution by the Australasian Plant Specialist Group. I was quizzed by IUCN officers about ANPC's role on the Species Survival Commission and in assisting with registering Australian plant species on the Global Red List [see editor's note below]. It appears that we need better co-ordination to produce an Australia-wide list of threatened plant species and to link it to IUCN. Each State or Territory in Australia is doing their own assessments of plant species, but these require co-ordination and unification across the country; the Commonwealth's EPBC listings are not the same as a national Red List.

We are in danger of going back to the bad old days before the ROTAP lists were developed by CSIRO in the 1980s. Can ANPC play a role—would the Commonwealth Government pay it to co-ordinate the States and Territories?

The depth of environmental problems on earth is so great that this is not the time to go backwards in environmental law and policy. Developed countries such as Australia must continue to lead in environmental conservation programs and assist other countries within its sphere to conserve their biodiversity.

[Editor's note: John's point about the IUCN/SSC's Australasian Plant Specialist Group is well taken. Appointments to this working group are made by IUCN on an invited individual basis. The ANPC is liaising with IUCN with a view to revitalising the Australasian group.]

DAVID GIVEN AWARDED SIR PETER SCOTT MEDAL

ANPC Committee member David Given (Curator of Christchurch Botanic Gardens) was recently awarded the Sir Peter Scott Medal for his services to global plant conservation with the World Conservation Union's (IUCN) Species Survival Commission. David is IUCN/SSC Plant Conservation Committee Co-Chair.

The award, one of the world's top awards for species conservation, was made at the World Conservation Congress in Bangkok (Thailand). Only about 20 or so of the medals have ever been awarded, and previous recipients have included Dr George Rabb (Director of Brookfield Zoo, Chicago), Jose Figueres (former President of Costa Rica), Dr Graeme Caughley (CSIRO, Australia), Professor Marshall Murphree (University of Zimbabwe), Dr William Conway (Pesident, Wildlife Conservation Society, New York) and Dr Tony Cunningham of South Africa (for his work with African countries on traditional use of plants and their sustainable utilisation). This year Dr Georgina Mace, Research Director of the London Zoological Society and Professor Harry Messel (Australia) were also recipients. The medal was presented by Dr David Brackett, chair of the SSC and former Director-General of the Canadian Wildlife Service.

David Given being presented with the Sir Peter Scott Medal at the The 3rd IUCN World Conservation Congress. Photo: Caroline Pollock

Update from the New Zealand Plant Conservation Network

John Sawyer
Secretary, New Zealand Plant Conservation Network
P.O. Box 16-102, Wellington, New Zealand ; Email: info@nzpcn.org.nz, web: www.nzpcn.org.nz

The New Zealand Plant Conservation Network has continued to grow with the number of members now exceeding two hundred and including schools, councils, and botanic gardens. *Trilepidea*, the Network's monthly newsletter is now read by over 700 people throughout New Zealand and the world.

The Network website (www.nzpcn.org.nz) is now the premier plant conservation site in New Zealand with over 6000 people visiting every month. The website has recently been upgraded with several new features using funding from the government's Terrestrial and Freshwater Biodiversity Information System (TFBIS). A new navigation system has been added as well as a password protection system so that access to some areas of the site is now restricted to members only. Fact sheets and lists for threatened fungi have been added and these will be completed over the next few months. In mid-December the Network published an on-line checklist of New Zealand indigenous vascular plants. Fact sheets for all 2341 indigenous vascular plants are also available from the site, although information and photos about each taxon are still to be added.

David Given, Network Council member and Curator of Christchurch Botanic Gardens, was last month awarded the Sir Peter Scott Medal for his services to global plant conservation with the World Conservation Union's (IUCN) Species Survival Commission. For further information see box on opposite page.

The Council is now seeking to employ an administration officer for next year to assist the Council with running the Network. Planning is underway for the Network conference in 2005 which will be held in Christchurch, South Island in August. More details to come soon.

Research Roundup

Denham, A.J. and Auld, T.D. (2004). **Survival and recruitment of seedlings and suckers of trees and shrubs of the Australian arid zone following habitat management and the outbreak of Rabbit Calicivirus Diseases (RCD).** *Austral Ecology* 29(5): 585-599.

Freeman, A.N.D. (2004). **Constraints to community groups monitoring plants and animals in rainforest revegetation sites on the Atherton Tablelands of far north Queensland.** *Ecological Management & Restoration* 5(3): 199-204.

Kirkpatrick, J.B. (2004). **Vegetation change in an urban grassland woodland 1974-2000.** *Australian Journal of Botany* 52(5): 597-608.

Paynter, Q. (2004). **Revegetation of a wetland following control of the invasive woody weed, *Mimosa pigra*, in the Northern Territory.** *Ecological Management & Restoration* 5(3): 191-198.

White, E., Tucker, N., Meyers, N. and Wilson, J. (2004). **Seed dispersal to revegetated isolated rainforest patches in North Queensland.** *Forest Ecology and Management* 192(2-3): 409-426.

Hodgson, J.G., et al. (2005). **How much will it cost to save grassland diversity?** *Biological Conservation* 122(2): 263-273.

Spooner, P.G. (2005). **Response of Acacia species to disturbance by roadworks in roadside environments in southern New South Wales, Australia.** *Biological Conservation* 122(2): 231-242.

Publications and Information Resources

Wildflowers of the North Coast of New South Wales

Barry Kemp, 2004, New Holland

The north coast region of New South Wales extends from Newcastle in the south to the Queensland border. *Wildflowers of the North Coast of New South Wales* describes over 300 of the most commonly seen plant species. Each entry is illustrated with a colour photograph. The book is organised by habitat, for example Costal Dunes, Coastal Heath, Open Forest and Rainforest.

ISBN: 1877069051. $29.95. Available online from CSIRO Publishing: http://www.publish.csiro.au

Fossil Plants

Paul Kenrick and Paul Davis, 2004, The Natural History Museum, London

Provides an overview of the development of plant life through time focusing on key events and periods. Beginning with the origins of plant life in the sea, the book traces the evolution of land plants, ferns, conifers and their relatives, and flowering plants. It is interwoven with 'snapshots' of landscapes and environments at various periods of geological time, focusing on plants but touching also on plant-animal interactions. Emphasis is placed on the use of fossil plants in reconstructing climate, vegetation, and other aspects of earth history. It is amply illustrated with both fossil plants, reconstructions of extinct species and the 'living relatives' of fossil plants which hold the key to discovering the environments of the past.

ISBN: 0643091319. $59.95. Available in Australia online from CSIRO Publishing: http://www.publish.csiro.au

Ocean shores to desert dunes – the native vegetation of New South Wales and the ACT

David Keith, 2004, Dept of Environment & Conservation (NSW)

Comprehensively describes each class of native vegetation in NSW and the ACT, explaining where it occurs and why; interesting aspects of ecology, evolution, history and development; as well as current conservation and management challenges. Includes more than 100 maps and over 400 colour photographs, and a species list for each vegetation class. This reference is the perfect companion to the many plant identification guides currently available, and is based on a significant new map and vegetation classification.

The Darling

Murray-Darling Basin Commission, 2004

This comprehensive work on the Darling River contains scientific and technical information that is necessary for the management of the river and its catchments. Chapters on natural systems illustrate the changes in species and habitat and identify what is necessary for their survival. Other chapters on sustainable land use examine environmental flows, responses to land use and the conservation of terrestrial environments. The final chapter looks at the future of the Darling River and its catchments.

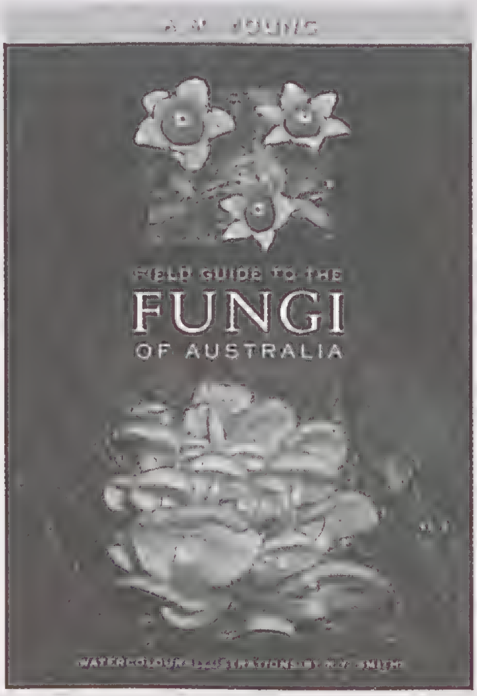
ISBN: 187683093X. $79.95. Available from CSIRO Publishing: http://www.publish.csiro.au

A Field Guide to the Fungi of Australia

Tony Young and Kay Smith, 2004, UNSW Press

Australia is world-renowned for its often extraordinary and unique natural environment – including many of its plants and animals. This beautiful little book highlights an often overlooked, but just as remarkable, aspect of our natural world: Australia's fungi. Many are brightly coloured, some fluorescent; some are elegant, others squat; some are fragrant, more still are highly toxic. This field guide showcases many of these species in all their splendour.

ISBN: 0868407429. $29.95. Available from http://www.unswpress.com.au



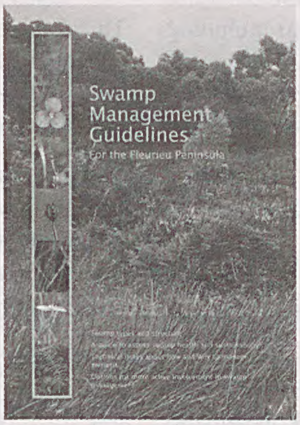
Web Freebies

Swamp Management Guidelines for the Fleurieu Peninsula

B. Hill & R. Duffield, Conservation Council of South Australia, 2002

Includes information on: swamp types and structure, a guide to assessing swamp health and sustainability, technical notes on how and why to manage swamps, options for more active involvement in swamp management, and includes a section on the major weeds found in swamps.

http://www.ccsa.asn.au/EmuWren/images/SMG.pdf



Swamp Management Guidelines
For the Fleurieu Peninsula

Wetland Inventory of the Mount Lofty Ranges

R. Seaman, Department for Environment and Heritage, SA, 2002

The Wetland Inventory of the Mount Lofty Ranges documents a representative sample of inland wetlands by recording their physical, chemical and biological attributes. Eighty five wetlands were surveyed and included brackish water bodies, freshwater wetlands, bogs and constructed wetlands.

Download from http://www.environment.sa.gov.au/biodiversity/pdfs/wetlands/mt_lofty.pdf

Integrating Mining and Biodiversity Conservation: Case studies from around the world

IUCN and ICMM

This book provides a compilation of case studies on mining and biodiversity conservation. Each of the 17 case studies provides a brief background on the issue, describes either the steps taken to resolve any differences or the program introduced to address the problem, and then outlines the lessons learned in the process.

The full report may be downloaded from http://www.icmm.com/library_pub_detail.php?rcd=173

Hard copies can be requested by emailing: info@icmm.com

EPBC community information booklets

EPBC Unit, Commonwealth Department of the Environment and Heritage

The EPBC Unit has completed production of its new EPBC community infomation booklets, and they are available from the EPBC Unit at (02) 6257 4010 or trich@wwf.org.au or online at http://www.wwf.org.au/News_and_information/Publications index.php?type=conservation_guide&filter=environmental_law

Conferences and Workshops

Second Riverina Biodiversity Forum: Biodiversity in modified landscapes: the challenges of reconciling biodiversity with irrigated agriculture

9-11 February 2005, Griffith, NSW

The forum aims to explore the challenges scientists, managers and landholders face in enhancing biodiversity within our current agricultural landscapes. For further information please contact Janelle McGufficke of Ricegrowers' Association of Australia, ph: (02) 6953 0598, email: jmcgufficke@rga.org.au.

The Ecology and Management of Cumberland Plain Habitats: A Symposium

16 February 2005, University of Western Sydney, NSW

This symposium aims to bring together ecological scientists and researchers, to inform each other and the community on the ecology and management of Cumberland Plain habitats. It is aimed at individuals from universities, government agencies (state and local), community groups and environmental groups. For additional information and to register contact B. Pellow, Janet Cosh Herbarium, University of Wollongong, email: bpellow@uow.edu.au

18th World Orchid Conference

11-20 March 2005, Dijon, France

Program and information available at: http://www.woc2005.org/

Beyond Declarations - Working Partnerships for Sustainability National Conference

16 - 18 March 2005, Manly Pacific Hotel, Manly, NSW

The conference is designed for all who are interested in developing effective sustainability partnerships including sustainability practitioners from all levels of government. For further information visit the Events page of http://www.batonforum.org.au/ or contact Julie McGraw, Ph: 02 9744 5252, email: jmcgraw@gemspl.com.au

'Seedbanking as a Conservation Tool' – A workshop for seed bank practitioners

4 - 7 April 2005, NSW Seed Bank – Mount Annan Botanic Garden, NSW

This workshop will cover the key areas of seed bank design and collection development and is designed for technical/horticultural staff who will be involved in establishing and operating seed banks in Australia. The course will suit Australian Millennium Seed Bank partners, government environmental agencies, Greening Australia and other NGOs, local councils and Landcare groups. Whilst not exclusively for Millennium Seed Bank partners, the workshop will be based on the processes required to collect and maintain conservation seed collections to the standard required by the MSB program in Australia.

Topics covered include: fundamentals of seed behaviour and viability; seedbanking as a conservation tool; seed bank design; planning for field collection; seed collection in the field; seed processing and packaging; databasing collections; viability testing/quality of seed batches; seed dormancy and research.

Cost: $200 (includes lunches as well as morning and afternoon tea). Spaces are limited and there are some assumed knowledge requirements.

For additional information please contact Mishy Mckensy – Seed Technology Officer, NSW Seed Bank, email: mishy.mckensy@rbgsyd.nsw.gov.au, ph: 02 46347912 or Amelia Martyn – Seed Research Officer, NSW Seed Bank, email: amelia.martyn@rbgsyd.nsw.gov.au, ph:02 46347968

National Conservation Incentives Forum

5 – 8 July, La Trobe University (Bundoora Campus)

Purpose is to share knowledge, experience and the skills required to manage conservation incentive programs. It is aimed at government and non-government conservation organisations and agencies, regional NRM organisations and local government. For more information contact Helen Searle helen.searle@deh.gov.au

XVIII International Botanical Congress

17-23 July 2005, Vienna, Austria

Preliminary program and information available at: http://www.ibc2005.ac.at/

First International Conference on Engaging Communities

14 - 17 August 2005, Brisbane Convention & Exhibition Centre, Queensland, Australia

This conference will explore all issues related to community engagement and address the experiences, challenges and research which effect all citizens, governments and organisations alike.

The program is designed to interest representatives from community groups, academia, government agencies, corporations, associations and the like. For further information mail: info@engagingcommunities2005.org or visit: http://www.engagingcommunities2005.org

Plant Conservation - The Challenges of Change National Conference of the ANPC

26 September to October 1 2005
The National Wine Centre Adelaide, South Australia

The Australian Network for Plant Conservation and the South Australian Department of Environment and Heritage invite you to Adelaide to exchange ideas and to participate in discussions on the challenges that currently face us all in plant conservation. Whether these be challenges of changing climates, changing environmental conditions, changes in government and policy focus, or confronting scientific information, this conference will stimulate consideration and participation.

The conference will appeal to all those involved in plant conservation from the on-ground practitioners to researchers and policy makers. All are invited to share experiences in managing for conservation in times of change and uncertainty.

For further information see http://www.plevin.com.au/ANPC2005

Growing Wetlands: International Wetlands Conservation and Restoration Workshop

early November 2005, Perth, Western Australia.

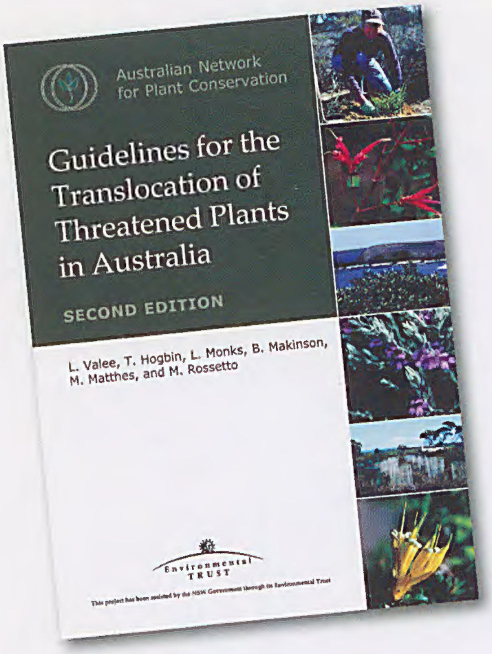
See flyer on back cover for information.

Eighth International Mycological Congress

20 – 26 August 2006, Cairns, Queensland

Will be the first International Mycological Congress held in the Southern Hemisphere. You can register interest online at http://www.sapmea.asn.au/conventions/imc8/index.html

Royal Botanic Gardens Victoria
RBG00013044



Australian Network for Plant Conservation

Guidelines for the Translocation of Threatened Plants in Australia

SECOND EDITION

L. Valee, T. Hogbin, L. Monks, B. Makinson, M. Matthes, and M. Rossetto

Environmental TRUST

This project has been assisted by the NSW Government through its Environmental Trust

Guidelines for the Translocation of Threatened Plants (Second edition)

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Growing Wetlands

ADVANCES IN WETLAND CONSERVATION AND RESTORATION WORKSHOP

The Botanic Gardens and Parks Authority (BGPA), at Kings Park and Botanic Gardens, Western Australia, is proposing to host the inaugural Advances in Wetland Conservation and Restoration Workshop in 2005, a timely event given the growing worldwide interest and recognition of wetlands and their values.

- The workshop will be co-presented by eminent US restoration ecologists - Dr Lyndon C. Lee and Dr Peggy L. Fiedler - and other invited speakers.
- The venue will be the new Western Australia Ecology Centre within the surrounds of Bold Park bushland.
- A one-day planning exercise and field trip is proposed for an inner urban wetland restoration project at Camel Lake - an iconic feature within Bold Park bushland - and for a new wetland site within Kings Park and Botanic Garden.

GOAL

The workshop aims to review current global good practice in wetland restoration and wetland biodiversity management, particularly within an urbanised context.

IMPORTANT DATES

The 3-4 day workshop is scheduled for early November 2005. Please register your interest by 28th February 2005 to the contacts listed.

Workshop program, registration and accommodation details will be available in 2005 on the BGPA website – *www.bgpa.wa.gov.au*

WORKSHOP AUDIENCE

All individuals with enthusiasm, passion and interest in wetland conservation and restoration are encouraged to attend (including scientists, consultants, land and water managers, government and non-government organizations, indigenous groups, students, community members and stakeholders).

CONTACT INFORMATION

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KINGS PARK & BOTANIC GARDEN
BOTANIC GARDENS & PARKS AUTHORITY

MURDOCH UNIVERSITY
PERTH, WESTERN AUSTRALIA

THE UNIVERSITY OF WESTERN AUSTRALIA

Australasian Plant Conservation
BULLETIN OF THE AUSTRALIAN NETWORK FOR PLANT CONSERVATION

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